Tailgate Safety Training for Landscaping and Horticultural Services

English Modules

Short, frequent, safety-training sessions keep safety in the forefront of employee’s daily routines. Employees remain interested, losses of production are minimized, and minimum preparation by the employer is needed. Frequent sessions keep safety on the minds of employees, demonstrate concern for the employee’s well being and reduce the number of employee injuries. The training components consist of 86 short modules in both English and Spanish audience formats.

English modules developed 2007 & Spanish modules developed 20008
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THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES
### Tailgate Safety Training for Landscaping and Horticultural Services, AEX-192-07

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Introduction to Safety in Landscaping and Horticulture Services
for Trainers and Supervisors

Objective: Explain why safety training is important and how it can reduce accidents.

**Trainer’s Note**

What makes safety important? Who is responsible for safety? What are some general safety tips? For this module:

- Review the basic information about safety.
- Provide some actual examples of safety hazards and health risks. Ask workers to share their own experiences.
- Present and discuss general safety tips.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

In the United States, the green industries rank high in work-related fatalities. Many accidents involve some type of machinery or equipment. Most accidents are predictable and preventable. Illnesses and health problems can also occur easily — green industry work involves exposure to weather and natural hazards and dangerous chemicals. Workers in the green industries must learn and practice safe working habits.

**Accidents Cost Time and Money**

Accidents cause injuries and, sometimes, even death. They involve intangible losses. You will lose time while you recover. Medical and therapy bills will add up. Worst of all, you might not be able to work as you did before the accident. Safety is too expensive not to be taken seriously. Accident costs reduce the profit margin. In the worst cases, accidents cost lives.

**Why Risk Your Health?**

A bee sting is unpleasant at least, and it can be fatal. Pesticides and caustic chemicals can cause long-term, serious health problems. Dust and mold can cause chronic lung problems. The hot summer sun can cause sunstroke and heat exhaustion, and winter can cause frostbite. How can you avoid those health risks?
Safety Is Everyone’s Responsibility

It is up to workers in the green industries to use safe working practices. All workers can contribute to each other’s safety. Remember — machinery operators aren’t the only ones who get hurt in accidents.

General Tips for a Safe Working Environment

• A good safety program starts with a safety status assessment.
• Make safety everyone's concern. This includes family, workers, visitors, and you.
• Be aware of what you are doing and your surroundings. Most injuries happen during routine, everyday tasks.
• Sometimes, you cannot handle a task alone. If you can’t, ask for help.
• Take short rest breaks. Don't over-exert yourself — don’t get so tired you get careless.
• Get plenty of sleep.
• Stay away from equipment if you are angry. Wait a little while until you cool down.
• Train new equipment operators before they work on their own.
• Read the operator's manual for all equipment.
• Wear the proper Personal Protection Equipment for everyday tasks and for specific jobs. You may need protective footwear with ankle support. You may also need close-fitting clothing.

For more information, refer to the other modules in this series, Tailgate Safety Training for Landscaping and Horticultural Services. They are listed below, organized in some basic areas.

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- Bee, Wasp, Hornet, and Yellow Jacket Stings
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- Mosquito Bites
- Poison Ivy, Poison Oak, and Poison Sumac
- Protecting Against Cold
- Skin Irritations Caused by Plants
- Spider Bites
- Sun Exposure
- Thorn Bushes
- Tick Bites

### Review These Important Points
- There are many work-related accidents in landscape and horticultural services.
- Safety is everyone's responsibility.
- Safety is too expensive to learn by accident. Accidents have many major costs.
- You can make the working environment safer by following a few simple safety measures.

### About These Modules
The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Answer Key: 1 = F, 2 = T, 3 = T, 4 = T, 5 = F.

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Introduction to Safety in Landscaping and Horticulture Services

Name____________________________________

True or False?

1. Only machinery operators need to worry about safety. T F

2. “Green industry” jobs have a high number of work-related fatalities. T F

3. The first step in a landscape and horticultural safety program is a safety status assessment. T F

4. Accident costs reduce the profit margin of your operation. T F

5. Wearing the proper PPE is only important if you are working with pesticides. T F
Objective: Using safe arc welding practices.

Trainer's Note

It is important to weld using safety precautions. There are many dangers related to welding. For this module:

- Review the information below on the hazards of arc welding and safety practices to avoid them.
- Demonstrate how to use Personal Protection Equipment (PPE).
- Have workers try on personal protection equipment.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Arc welding includes shielded metal-arc, gas-shielded, and resistance welding. Arc welding equipment varies in size and type, so it is important to read and follow the manufacturer’s recommendations.

General Arc Welding Safety

- Read all warning labels and instruction manuals, especially if this is the first time you’re using the equipment.
- Proper eye protection is mandatory.
- Before starting any welding, make a complete inspection of the welder.
- Remove all potential fire hazards from the welding area.
- Always have a fire extinguisher ready.
- Equip welding machines with power disconnect switches for quick shut off.
- Disconnect the power to the machine before making repairs.
- Proper grounding of welding machines is essential.
- Electrode holders should not be used if they have:
  - Loose cable connections
  - Defective jaws
  - Poor insulation
- Remove rods when the job is finished.
- Do not strike an arc if someone without proper eye protection is nearby.
Personal Protection Equipment

- Infrared radiation can burn your retinas. It can also cause cataracts. Protect your eyes and face with a welding helmet properly fitted and with the proper grade of filter plate.
- Protect your body from welding spatter and arc flash with protective clothing such as:
  - Woolen clothing
  - Flameproof jacket
  - Flameproof apron
  - Gloves
  - Properly fitted clothing — not frayed or worn
  - Long-sleeve shirts
  - Straight-legged trousers that cover shoes
  - Fire resistant cape or shoulder covers for overhead work
- Check protective clothing before each use to make sure it is in good condition.
- Keep clothes free of grease and oil.

Proper Ventilation

Sometimes workers weld in confined areas with barriers to air movement. Be sure there is adequate ventilation available. Natural drafts, fans, and positioning of the head can help keep fumes away from the welder’s face.

When Is Natural Ventilation Sufficient?

- If the room or welding area contains at least 10,000 cubic feet for each welder.
- If the ceiling height is not less than 16 feet.
- If partitions, equipment, or other structural barriers do not block cross ventilation.
- If welding is not done in a confined space.

If requirements for natural ventilation are not met, then the area needs to be mechanically ventilated. Ventilation must exhaust at least 2,000 cubic feet per minute of air for each welder, except:

- Where local exhaust hoods or booths are used.
- Where air-line respirators are used.

Avoiding Electrical Shock

Electrical shock can kill. To prevent electrical shock:

- Use well insulated electrode holders and cables.
- The electrode holder, or stinger, should be in good condition with no cracks or missing insulation.
- Never leave the welding electrode in the electrode holder, or stinger, when not attending the work.
- Make sure welding cables are dry and free of grease and oil.
- Keep welding cables away from power supply cables.
- Wear dry hole-free gloves.
- Clothing should also be dry.
- Insulate the welder from the ground by using dry insulation, such as a rubber mat or dry wood boards.
- Ground frames of welding units.
- Never change electrodes with bare hands or wet gloves.
Review These Important Points

- Proper personal protective equipment is important.
- Electrical shock can be deadly.
- If ventilation is not sufficient, the welding area should be mechanically ventilated.
- Always have a fire extinguisher ready for immediate use.

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Arc Welding Safety for Trainers and Supervisors

Name____________________________________

True or False?

1. All fire hazards should be removed from the welding area.  
   T  F

2. Use natural drafts or fans to keep the fumes away from your face.  
   T  F

3. Eye protection is not always needed.  
   T  F

4. It is acceptable to use electrode holders with loose cable connections.  
   T  F

5. Electrodes should not be changed with bare hands or wet gloves.  
   T  F
Battery Safety for Trainers and Supervisors

Objective: Use and store batteries safely.

**Trainer’s Note**

Batteries produce power on demand — and accidents on occasion. For this module:

- Discuss the information below on different types of batteries.
- Ask workers to identify the battery types used in your operation.
- Show examples of the types of batteries you use and their features.
- Demonstrate how to connect a battery safely.
- Have workers practice connections as you supervise closely.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

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**Background**

Lead-acid storage batteries are chemical storage devices that produce power. The typical battery has a number of cells with layers of lead plates in sulfuric acid. When sulfuric acid contacts the lead plate inside the cell, energy is produced. The main battery terminals are the positive and negative posts. The battery may also have
vent caps on top. These permit the checking and maintenance of water and acid levels. They also provide a vent for the escape of gases formed when the battery charges.

**Types of Batteries**

**Car-starting batteries** start cars and trucks quickly at minimum weight, size, and cost. These batteries have lead sponges rather than sturdy lead plates. These thin sponges are delicate and start to break down after less than 100 cycles.

**Deep-cycle batteries** are compact and inexpensive. They should last for 200 to 400 charge-discharge cycles. These storage batteries are packaged in the same small automotive case and contain somewhat thicker plates of lead. Avoid acid spills by placing the battery in an upright and level position.

**Gel-cell batteries** are used in aircraft and are portable. They are usually small and work in any position. They have sealed gel cells to prevent acid vapors and spills. If charged or discharged too rapidly, gas will build up, causing the battery case to rupture. Besides possible rupture, storage at temperatures above 78°F accelerates self-discharge and shortens the battery’s life. This battery is more expensive but safer and cleaner.

**Safety Tips for Working With Batteries**

- Keep sparks and flames away from the battery. Inspect the battery in natural light.
- Remove wristwatches, which might make electrical contact and create sparks.
- Wear gloves and a chemical apron when handling lead acid batteries. Sulfuric acid can cause painful burns that damage tissue. Battery surfaces often have a film of acid mist and lead that has leached out of the battery.
- Wear chemical splash goggles or a face shield with splash protection when inspecting or cleaning the battery. For more details, see the Tailgate Safety Training module *Personal Eye Protection*.
- If acid does enter the eye, immediately flush with running water for at least 30 minutes. See a doctor as soon as possible.
- If acid contacts the skin, wash the affected area immediately with plenty of water.
- Avoid chemical burns by not rubbing eyes or skin while working with the battery.
- Wash your hands immediately after completing the job.
- Clean up all acid spills and flush clothing with a water and baking soda solution.
- Vent caps should be tight and level. Placing a damp cloth over vent caps when charging may act as a flame arrester.
- Keep batteries away from children.
- Smoking or open flames should never be present in a battery area, and ventilation is important.
- Store batteries in a cool, dry place. Storage temperature should be between 80°F and 32°F.
- Always make the negative/ground connection first, then the live connection.
- A match, incorrect connection of battery cables, or careless use of tools around the battery can set off explosive gases.
- Use proper lifting techniques when moving batteries. Batteries are small but heavy and awkward to lift. For more information, see the Tailgate Safety Training module *Preventing Lifting and Over-Exertion Injuries*.

**Review These Important Points**

- There are different types of batteries for different jobs.
- Smoking or an open flame should be kept away from batteries.
- Protect the eyes, face, and body from battery acid.
- Live connection directly to the battery should not be made.
About These Modules

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Battery Safety for Trainers and Supervisors

Name____________________________________

True or False?

1. Ventilation is not important in the battery area. T F
2. Batteries should be stored in a cool, dry place. T F
3. It is acceptable to make live connections directly to the battery. T F
4. The eyes, face, and body should be protected from battery acid. T F
5. Batteries should be inspected in natural light. T F
Bee, Wasp, Hornet, and Yellow Jacket Stings for Trainers and Supervisors

Objective: Identify general tips to prevent and treat bee, wasp, hornet, and yellow jacket stings.

Trainer’s Note

Bees, wasps, hornets, and yellow jackets can be a minor nuisance — or a serious danger. For this module:

- Review the information on stings, reactions to stings, and how to prevent them.
- Ask workers to describe their own reactions to stings.
- Review the important points.
- Have workers take the True/False test to check their learning.

Background

Between one and two million people in the United State are very allergic to stinging insect venom. Every year 90 to 100 people die from sting reactions. Many more deaths may happen, mistakenly diagnosed as heart attacks or sunstrokes or attributed to other causes. More people die yearly from the effects of insect venom than from spider bites.

Stinging insects can present an occupational health problem, mainly for sensitive workers. Usually, danger occurs when workers disturb nests of stinging insects such as bees, wasps, hornets, or yellow jackets.

Mild Reactions

Most people have a mild reaction to bee, wasp, hornet, or yellow jacket stings:

- Itch
- Irritation
- Redness
- Swelling
For a mild reaction, you can relieve symptoms with ice, baking soda, meat tenderizer, 1% to 2.5% ammonia solution, topical steroids, or oral steroids.

**Anaphylaxis**

The most severe allergic reactions to stings can be fatal. These reactions, called anaphylaxis, can include life-threatening symptoms:

- Breathing problems
- Swelling of the lips or throat
- Faintness
- Confusion
- Rapid heartbeat
- Hives

For any severe allergic reaction, seek emergency medical help *immediately*. Reaction may occur in a few minutes; death often occurs within 30 minutes.

**Preventing Stings**

Workers can take some simple steps to prevent stings, both in the open outdoors and in greenhouses.

- Use a commercially available stinging insect control aerosol to destroy nests. It can shoot a high-volume spray stream 15 to 20 feet.
- Do not stand directly under an overhead nest you are trying to destroy. If possible, hire a professional exterminator to remove a nest.
- Never try to burn or flood a nest with water since this will only make stinging insects angry.
- Be careful not to mow over a nest in the ground or disturb a nest in a tree or the eaves of the home.
- Never strike or swing at a wasp or a bee.
- Never trap a wasp or a bee against your body. That can cause the insect to sting.
- Wear a hat and closed shoes (not sandals).
- Light-colored cotton clothing is best. Avoid white or bright-colored, loose-fitting clothing.
- Never wear wool around stinging insects because wool retains some degree of animal odor even after extensive processing.
- Avoid heavy, flowery perfumes, colognes, or scents. They may attract bees.
- Run away from bees, wasps, hornets, or yellow jackets. They are not very fast, and you can usually outrun them.
- Avoid sweet beverages, which can attract stinging insects.
- Do not drink out of a can. Bees might be inside the can where you cannot see them.

**Review These Important Points**

- Be careful not to mow over a nest in the ground nor disturb a nest in a tree or the eaves of the home.
- The most severe allergic reactions to stings can be life threatening.
- Avoid disturbing nest of bees, wasps, hornets, or yellow jackets.
About These Modules

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Bee, Wasp, Hornet, and Yellow Jacket Stings for Trainers and Supervisors

Name _______________________________ 

True or False?

1. Stinging insects calm down when their nest is burned or flooded with water. T F

2. It is best to drink sweet beverages out of a can because bees cannot get inside the can. T F

3. Rapid heartbeat and breathing problems are a normal, mild reaction to a sting. T F

4. Run away from stinging insects. They are not very fast. T F

5. Ice or baking soda may be useful for stings causing itch, irritation, redness, and swelling. T F
Objective: Use bucket trucks and aerial lifts safely.

**Trainer’s Note**

Bucket trucks and aerial lifts can make it easy to work in trees, but they can also be dangerous. For this module:

- Review the information below on hazards and safety practices.
- Ask workers to give their own examples of risks of bucket trucks and aerial lifts.
- Demonstrate safe practices and supervise workers closely as they practice safe operation.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

According to Occupational Safety and Health Administration (OSHA) statistics, some 30 workers die each year from using aerial lifts. More than half of those involve bucket trucks. Most of the others involve aerial lifts. A tree can strike the bucket and throw the worker out. Power lines might touch the bucket or lift and electrocute the worker.

For more details on related safe practices, refer to these Tailgate Safety Training modules:

- Preventing Falls From Trees
- Overhead Electrical Hazards
- Struck-By Accidents
- Tree Pruning, Trimming, and Felling Safety

**Bucket Trucks and Aerial Lift Hazards**

- Tip-overs
- Falls
- Electrocution
• Being caught between the lift buckets or guardrail and trees
• Being struck by falling branches or trees

General Safety Tips
• Do not operate a lift unless you have received proper training.
• Keep the lift controls clean and legible.
• Wear a full-body harness when using the bucket truck.
• Always close lift platform chains or doors.
• Stand on the floor of the bucket or lift platform. Do not climb on or lean over guardrails.
• Do not ride on bumpers.
• Do not exceed manufacturer’s load-capacity limits.
• Use work-zone warnings like cones and signs if working near traffic.
• Do not modify an aerial lift without written permission of the manufacturer.
• Use proper personal fall protection.

To Prevent Electrocution
• Keep yourself and all objects at least 10 feet away from any conductors.
• Non-electrical workers must stay at least 10 feet away from overhead power lines.
• Electrical workers must insulate power lines. Use proper personal protection tools.
• Insulated buckets help protect against electrocution. However, you must make sure there is no other path for the electricity to ground. Never touch another wire.

To Prevent Falls
• On bucket trucks, wear a full-body harness and lanyard or a restraining device with a 2-foot lanyard. This will keep you inside guardrails.

To Prevent Tip-Overs
• Do not drive with the lift platform elevated.
• Do not exceed vertical or horizontal reach limits.
• Do not exceed the specified load-capacity of the lift.
• On an elevated scissor lift, avoid pushing or pulling.

Review These Important Points
• Always close lift platform chains or doors.
• Do not climb on or lean over guardrails, or ride on bumpers.
• Do not exceed load-capacity limits.

About These Modules
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Bucket Truck and Aerial Lifts for Trainers and Supervisors

True or False?

1. Workers can modify an aerial lift without written permission of the manufacturer. T F
2. Non-electrical workers must stay at least 5 feet away from overhead power lines. T F
3. Electrical workers must insulate power lines or use proper personal protective tools. T F
4. Do not drive with the lift platform elevated. T F
5. On an elevated scissor lift, avoid too much pushing or pulling. T F
Caught In or Between Objects for Trainers and Supervisors

Objective: Avoid being caught in or between objects.

Trainer’s Note

Workers can sustain serious injuries when they are caught in machinery parts or caught between objects. For this module:

- Review the reasons why caught-in and caught-between accidents happen.
- Discuss the typical caught-in or caught-between incidents presented.
- Have workers discuss why the accidents in the scenarios occurred and how they could be prevented.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Green industry workplaces are full of heavy objects that can move — vehicles, equipment, machinery. Many of those objects also have moving parts. Objects that are raised off the ground can fall. When one of those objects moves unexpectedly or falls, it can land on a worker. The worker can be caught between the object and the ground or another object.

Or a worker can be caught in moving machinery parts. Caught-in or caught-between accidents can occur between a power-take-off (PTO) and the shielding, as shown here. Other hazards include pinch points, cut points, and crush points. For more information, see the Tailgate Safety Training module Protecting Hands and Fingers.
**Reasons Caught-In and Caught-Between Accidents Happen**

- Working on moving equipment.
- Working under mental or physical stress.
- Using unsafe equipment.
- Lack of training or instructions.
- Inadequate guarding on machines.
- Incorrect hitching practices.
- Distraction.

Here are some typical accidents, along with safe practices that could prevent them.

<table>
<thead>
<tr>
<th>Accident</th>
<th>Safety Practice</th>
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<td>• While hauling sod, a worker stopped to change a flat truck tire. The truck fell off the jack, pinning the worker between the ground and the truck. • Two workers were working on a stationary conveyor when it fell off its stands. The workers were caught under the equipment.</td>
<td>Never work under a vehicle or equipment that is supported only by a jack or a stand. The jack or stand could tip, and the raised equipment then will be dropped on the person under it. For more details, refer to the Tailgate Safety Training module <em>Safe Use of Jacks</em>.</td>
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<td>• A worker removed the shields on the PTO for repairs but failed to replace them after service. Another worker got caught in the PTO.</td>
<td>After servicing, all PTO shields <strong>must</strong> be replaced. Only snug-fitting clothing should be worn when working around a PTO. This will prevent clothing from being caught in the PTO. For more information, refer to the Tailgate Safety Training modules <em>Safe Use of the Power-Take-Off (PTO)</em> and <em>Power-Take-Off (PTO) Shielding</em>.</td>
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<td>• A nursery worker unhitched a wagon without chocking the wheels and was run over when the wagon rolled forward. • A worker forgot to chock the equipment trailer when unloading a mower and was caught between the trailer and the building.</td>
<td>While unloading or working on equipment, the wheels of equipment need to be pinned to hold them stationary. This procedure is called chocking. By chocking the wheels, the equipment will be unable to roll and cause injury. For more details, refer to the Tailgate Safety Training module <em>Chock and Block</em>.</td>
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<td>• While backing a loaded equipment trailer to a truck, a worker was caught between the truck and the trailer.</td>
<td>When helping someone to hitch equipment or an implement to a truck or tractor, stand to the side. That way, the driver can see you. Also, you won’t be between the truck and the equipment.</td>
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**Review These Important Points**

- Always chock a vehicle before doing any work on it.
- Always chock towed equipment before unhitching it.
- Use caution when working with moving equipment.
- Replace shields immediately after service or repairs.
- Never work on raised equipment on a stand — always block it first.
About These Modules

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Caught In or Between Objects for Trainers and Supervisors

Name___________________________________

True or False?

1. Always replace the shields after servicing equipment. T F
2. Never work under equipment that is supported only by a jack. T F
3. When unhitching a wagon, it is not necessary to chock the wagon wheels. T F
4. It is not important to follow safe operating procedures. T F
5. Working on moving equipment may cause caught-between accidents. T F
Chain Saw Safety for Trainers and Supervisors

Objective: Explain what safety precautions to take when working with a chain saw and demonstrate proper maintenance of the chain saw.

**Trainer’s Note**

Chain saws are powerful but dangerous tools. For this module:

- Review the information below on how to use a chain saw safely.
- Ask an experienced chain saw user to demonstrate the proper procedure. Reinforce safety practices during the demonstration.
- Allow employees to practice the safe methods of using a chain saw. Stress the use of protective clothing and equipment.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Chain saws are great tools for landscapers and arborists. Their powerful motors cut through heavy trunks, branches, and brush quickly and easily. However, that power also brings danger. Safe practices are critical in using chain saws.

**Operator’s Manual**

Keep the operator’s manual with the chain saw. A good place to store it is in the chain saw case. If the manual is missing, contact the manufacturer for a replacement. Periodically review the manual for safe operating procedures.
Personal Protection Equipment

Use the proper Personal Protection Equipment (PPE) for the job. Use the following as a guide:

- Clothing should fit well and be free of dangling or ragged edges that can become tangled in the saw.
- Nylon mesh protective leg chaps and/or kneepads can provide increased protection for the legs.
- A hard hat protects the head from falling limbs or branches. A properly fitted hat is cool, comfortable, and provides protection from head injury.
- A full-face shield or safety goggles/glasses that have side shields prevent injury from flying wood chips, twigs, and sawdust.
- Protect ears from the high level of noise by using earplugs in combination with earmuffs.
- Safety boots or shoes with high tops protect ankles in the event of accidental contact with a moving saw blade. Steel-toed boots will help protect the feet from falling limbs or logs.
- Lightweight leather gloves protect hands from cuts, splinters, and abrasions.

Preventive Maintenance

Keep the saw in good repair. Consult the operator’s manual and check for needed maintenance before each use. The operator’s manual can be the best source of information for this procedure.

When to Sharpen the Saw

- If the chain tends to “walk” sideways while cutting.
- If the cut shows fine powder instead of chips.
- If it is necessary to press hard to cut.
- If you smell burnt wood or see smoke coming from the blade area.

With correct chain tension, you get good cutting action and a long chain life. If too loose, a chain will derail; if too tight, a chain will bind.

Proper lubrication prolongs the life of the saw and increases safety.

Follow These Precautions When Fueling and Starting the Chain Saw Engine

- **Never smoke** when you are fueling or using a chain saw.
- With electric saws, use caution to avoid shock hazards.
- Fuel in gasoline-powered saws can cause a fire or burns.
- Only refuel the engine when it is cool.
- Never smoke when working with a power saw.
- To start the saw, always brace the saw by placing it on the ground and putting one foot on the bracket to the rear of the saw.
- Grip the top handle of the saw firmly with one hand and use the other to pull the starting rope.
- **Never** drop-start the saw. That is, never try to start the saw by holding it in one hand while pulling the rope with the other hand.

Transporting and Storing the Chain Saw

Transport a power chain saw in a chain guard or a carrying case. Do not carry the saw in the passenger area of a vehicle. Brace the saw so that it cannot tip.

When storing the saw, drain the fuel tank back into the supply container and run the engine at the idle until it stops. Remove the chain and store in oil. Disconnect the spark plug to prevent an accidental starting. Keep out of the reach of children.
Review These Important Points

- Wear close-fitting clothing.
- Use a face shield or safety goggles, ear protection, safety boots, and gloves.
- Keep equipment in good repair and make adjustments as needed.
- Follow recommendations for refueling and safely starting saws.
- Only use saws that are equipped with chain brakes you can trigger in an emergency or that are automatically triggered by a kickback, a life-threatening situation.

About These Modules

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Chain Saw Safety for Trainers and Supervisors

True or False?

1. Transport a power chain saw in a chain guard or a carrying case. T F
2. Start a chain saw by putting one foot on the rear of the saw. T F
3. Refuel the engine as soon as it runs out of gas. T F
4. Correct chain tension results in good cutting action and a long chain life. T F
5. A hard hat will protect the head from falling limbs or branches. T F
Chemical Skin Irritants for Trainers and Supervisors

Objective: Prevent and treat hazards from chemical skin irritants.

**Trainer's Note**

Skin is a valuable body tissue; it must be protected from chemical irritants. For this module:

- Review the information below on chemical irritants and their effects.
- Ask workers to identify chemical irritants in their workplace.
- Review the Personal Protection Equipment (PPE) workers should use.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Different chemicals can irritate the skin. Some chemicals remove fats and oils from the skin. When this occurs, the skin becomes cracked and dry. Irritants can also cause severe burns. Or irritants can cause oils and waxes to plug hair follicles and sweat ducts. That can cause dermatitis and acne.

Types of irritants are shown on the next page. The table also lists examples and effects.

**Dermatitis**

With dermatitis, the skin is inflamed and irritated. There are two types:

- **Primary irritation.** Occurs from contact with a chemical irritant.
- **Sensitization.** Skin becomes more sensitive after exposure. Then, just a small amount can cause a severe allergic reaction.
## Types and Effects of Chemical Irritants

<table>
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<th>Chemical Irritant</th>
<th>Examples</th>
<th>Found In</th>
<th>Effects</th>
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<td>Strong acids</td>
<td>Hydrochloric acid</td>
<td>Fertilizers</td>
<td>Severe burns</td>
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<td>Dyes</td>
<td>Brief or prolonged effects</td>
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<td>Paint pigments</td>
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<td>Sulfuric acid</td>
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<td>Phosphate fertilizers</td>
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<td>Nitric Acid</td>
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<td>Metal working</td>
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<td>Strong caustics</td>
<td>Sodium hydroxide</td>
<td>Soaps, detergents</td>
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<td>Cleaning products</td>
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<td>Adhesives</td>
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<td>Paint remover</td>
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<td>Disinfectants</td>
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<td>Potassium hydroxide</td>
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<td>Disinfectants</td>
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<td>Sterilizing agents</td>
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<tr>
<td>Strong solvents</td>
<td>Dichloromethane</td>
<td>Paint remover</td>
<td>Prolonged dermatitis</td>
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<tr>
<td></td>
<td>N-methylpyrrolidine</td>
<td>Alcohol</td>
<td>Prolonged acne</td>
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### Chemical Irritant Safety Practices

- Identify hazards before working with chemicals.
- Read the Material Safety Data Sheet (MSDS) and labels on the containers.
- Identify emergency procedures in case an accident occurs.
- Avoid contact with strong chemical irritants.
- Use Personal Protection Equipment.
  - Goggles
  - Gloves
  - Sleeves
  - Aprons
  - Shields
  - Footwear
- In case of exposure
  - Use showers, eyewash fountains, hand/face spray units, and other emergency equipment.
  - Call 911 if appropriate.
  - Report accidental exposures to hazardous substance.

### Review These Important Points

- Be aware of all types of skin irritants.
- Know what substances you use that may be dangerous.
- Follow the correct procedures in an emergency.
- Wear protective equipment when on the job.
- Use emergency equipment and call 911 if appropriate.
About These Modules

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Chemical Skin Irritants

Name ________________________________

True or False?

1. Caustics can remove fats and oils from the skin. T F

2. Skin is a valuable body tissue. T F

3. It is not necessary to avoid direct contact with primary irritants. T F

4. Strong acids can cause severe burns. T F

5. An allergic reaction can be the result of exposure to solvents. T F
Objective: Secure a vehicle or a piece of equipment using the chock-and-block method.

**Trainer’s Note**

Serious injuries can happen when a vehicle or piece of equipment moves while it is being worked on. Chocking and blocking prevent movement and prevent injuries. For this module:

- Present the information below on the purpose and techniques of chocking and blocking.
- To demonstrate the chock and block principles, have the training session in the shop or in the field. Demonstrate how to chock and block different types of vehicles or equipment.
- Have workers practice chocking and blocking under your supervision.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Sometimes it is critical to make sure that a vehicle or towed equipment cannot move:

- When a trailer or other towed equipment is being unhooked.
- When a vehicle or any equipment on wheels is in the shop for work.
- When workers are working under a vehicle or equipment on wheels.

Chocking the vehicle or equipment keeps it from rolling forward or backward. Blocking the vehicle or equipment keeps it from falling on workers under it. The reason behind chocking and blocking is the same: secure the vehicle or equipment to prevent movement. Movement can cause injuries or even death — so it should always be prevented.

**Chocking**

Workers can be caught between a vehicle and the equipment or a piece of equipment and the shop wall because the proper chocking procedures were not followed. It is a simple concept, but many workers forget to use this procedure when working with or around equipment. In some cases, workers have been killed or injured because they have failed to follow this procedure.
The purpose of the chock is to secure the wheels and hold them stationary. When unhooking towed equipment from a tractor or truck, make sure the tires on the equipment have been chocked to prevent the operator or bystanders from being injured if a roll back occurs. Do not rely on the equipment’s brakes. The rear-most axle should be the one that is chocked. Tires may need to be chocked in both the front and the rear on some equipment.

**Blocking**

When working on equipment, never rely only on jacks or hoists to support the equipment. The equipment should be blocked to support it while you are working on it. Use jacks or hoists only to raise the equipment. Then, build a platform of solid blocks to hold the equipment up in place. Be sure to keep your hands, fingers, and feet away — never put them between the equipment and the blocks.

**Tips to Remember**

- Chock wheels at the rear axle.
- Do not unhook equipment that has not been chocked.
- Never put hands, fingers, or feet between equipment and blocks.
- Double up and alternate the positioning of blocks while building the platform.
- Use larger blocks on the bottom. Make the platform as wide as possible.

**Review These Important Points**

- Rear axles need to be chocked.
- Do not attempt to unhook equipment that has not been chocked.
- Never put hands, fingers, or feet between equipment and blocks.
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Chock and Block

True or False?

1. There is no need to chock equipment before it is unhooked from the vehicle.  T   F
2. The purpose of the chock is to pin the wheels and hold them stationary.  T   F
3. It is fine to support a vehicle with a jack while you are under the vehicle.  T   F
4. When chocking a loaded wagon, chock the rear axle.  T   F
5. Blocking a vehicle is only necessary when a trailer is attached.  T   F
Choosing Spray Nozzles for Trainers and Supervisors

Objective: Choose and use nozzles properly and safely.

**Trainer’s Note**

Spray nozzles play a big role in effective application and spray drift. For this module:

- Review the information below on choosing and cleaning nozzles and reducing spray drift.
- Show workers the differences between different spray nozzles.
- Demonstrate cleaning techniques.
- Have workers practice cleaning techniques.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Nozzles regulate droplet size, spray flow, and spray pattern. The right spray nozzle is critical for safe spraying and effective application. The right nozzle causes less spray drift to unintended areas like other crops or backyards. Other safe techniques can also help reduce spray drift.

**Flow regulation** affects the application rate. Nozzle opening size and spray pressure affect the flow rate through nozzles. These factors can be varied by selecting a different nozzle size or adjusting the pressure.

**Droplet size** varies with several factors:

- Pressure
- Weather conditions
  - Temperature
  - Humidity
  - Wind speed and direction
- Nozzle size
- Spray angle
- Spray pattern shape
Usually, increasing nozzle pressure decreases droplet size. Increasing tip spray angle can also decrease droplet size. As shown in the figure, smaller droplets drift longer distances.

Weather has a strong influence on spray drift. Wind direction and speed can cause spray to drift away from its target. The larger the droplet, the faster it falls toward its target, and the less likely it is to drift. However, high winds can cause large droplets to drift off target.

Nozzle Spray Patterns

There are three basic nozzle spray patterns. Each is best for certain applications.

- Flat-spray, or flat-fan, nozzles spray droplets from a flat-spray tip. They form a fan-shaped pattern as they leave the nozzle opening.
  - A flat-spray nozzle is the only kind that puts out herbicide accurately and uniformly.
  - The edges of the pattern have a lower spray volume. So, patterns of adjacent nozzles must overlap to obtain uniform coverage.
  - Wider-angle nozzles produce smaller droplets.
  - Narrow-angle spray tips produce a more penetrating spray. They are also less likely to become clogged.

- Hollow-cone nozzles produce a spray pattern with the liquid on the outside of a cone.
  - These are best when penetration and coverage are critical.
  - The typical spray distribution is saddle-shaped. There is less liquid in the center of the distribution, tapering off rapidly at the edges.
  - It is not well suited for broadcast applications; proper overlap is difficult.
  - Generally produces the smallest droplets.
  - Spray drift can be high because of the many small droplets produced at the normal operating pressure of 40 pounds per square inch (psi) and above.

- Wide-angle full-cone nozzles produce large droplets distributed throughout a full cone.
  - These are good for soil-applied and systemic herbicides.
  - Maximum drift control at pressures of 15 to 20 psi is achieved.
  - The uniform spray pattern is maintained over a pressure range of 10 to 40 pounds per square inch (psi).
  - Droplets are larger than with other tip styles of equal capacity at similar pressures.
Cleaning Nozzles

- Use water that looks clean enough to drink when cleaning the sprayer. Foreign materials in the water can wear out nozzles.
- Watch the output pattern of nozzles periodically. Streaks in the pattern indicate foreign material inside the nozzles.
- Remove and clean nozzles. Use a soft brush for the tip and screen with strong detergent solution or kerosene.

- Use a wooden toothpick to unclog nozzle tips. A pin, a knife, or any other metal object can completely change the spray pattern capacity of the tip.

Spraying Tips to Reduce Drift

- Follow label recommendations to avoid drift with highly volatile pesticides.
- Use nozzles that produce coarser droplets on targets that do not require small, uniformly distributed droplets.
- Keep spray volume up.
- Use nozzles with larger orifices.
- Use nozzles with narrower spray-fan angles.
- Avoid spraying on extremely hot and dry days.
- Do not spray when wind speeds are higher than 5 miles per hour.
- Avoid spraying near sensitive crops downwind. Leave a buffer strip of 50 to 100 feet, and spray the strip later when the wind shifts.

Personal Protection Equipment

Workers must wear proper Personal Protection Equipment (PPE) when working with any type of pesticide, herbicide, or spray. Consult the product label for equipment requirements, such as latex gloves. For more details, refer to the Tailgate Safety Training modules Reading Pesticide Labels and Personal Protection Equipment (PPE) for Pesticides.

Review These Important Points

- Nozzles regulate spray flow, droplet size, and spray pattern.
- Opening size and spray pressure affect flow rate through the nozzle.
- Droplet size varies due to pressure, climatic conditions, and nozzle size.
- There are three basic spray pattern shapes — flat-spray, hollow-cone, and full-cone.
About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Choosing Spray Nozzles

Name____________________________________

True or False?

1. There are three basic nozzle spray patterns — flat-spray, hollow-cone, and full-cone patterns.   T   F

2. Flow regulation has nothing to do with the application rate.   T   F

3. Hollow-cone nozzles can result in high spray drift because of the many small droplets produced.   T   F

4. Nozzles should be cleaned with a regular detergent and a pin or a knife.   T   F

5. Streaks in the nozzle’s output pattern means that foreign material is in the nozzle.   T   F
Color Coding for Trainers and Supervisors

Objective: Use the color code system to identify workplace hazards.

Trainer’s Note

A consistent color system warns of safety hazards. For this module:

- Present the colors in the color code system and their meaning.
- Lead a tour of your workplace. Have workers point out examples of color coding and the hazards identified.
- Ask workers to watch for hazards that are not appropriately color coded.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

The color coding system increases employee safety. All workers should be familiar with the system. Re-assigned workers should learn the codes in their new area.

Below is the standard color code system. A copy of the color code should be easy to find for quick reference. Use clearly printed labels with colors. Signs, tags, and tickets should all follow the same system.

<table>
<thead>
<tr>
<th>The Standard Color-Code System</th>
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<tbody>
<tr>
<td>Red</td>
<td>Fire safety equipment</td>
</tr>
<tr>
<td>Should also show the word</td>
<td>Safety containers for flammables</td>
</tr>
<tr>
<td>DANGER</td>
<td>Emergency devices</td>
</tr>
<tr>
<td></td>
<td>• Emergency shut-off switches</td>
</tr>
<tr>
<td></td>
<td>• Stop bar</td>
</tr>
<tr>
<td></td>
<td>• Buttons</td>
</tr>
<tr>
<td>Orange</td>
<td>Machinery or equipment that can</td>
</tr>
<tr>
<td></td>
<td>• Cut</td>
</tr>
<tr>
<td></td>
<td>• Crush</td>
</tr>
<tr>
<td></td>
<td>• Shock</td>
</tr>
<tr>
<td></td>
<td>• Cause other injury</td>
</tr>
</tbody>
</table>
### The Standard Color-Code System (continued)

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
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</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Physical dangers</td>
</tr>
<tr>
<td>Should also show the word</td>
<td>• Slipping</td>
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<tr>
<td>CAUTION</td>
<td>• Tripping</td>
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<tr>
<td></td>
<td>• Falling</td>
</tr>
<tr>
<td></td>
<td>• Caught-between hazards</td>
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<td></td>
<td>• Striking-against hazards</td>
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<tr>
<td>Green</td>
<td>First-aid equipment.</td>
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<tr>
<td>Blue</td>
<td>Equipment under repair</td>
</tr>
<tr>
<td></td>
<td>• Do not start equipment</td>
</tr>
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<td></td>
<td>• Do not move equipment</td>
</tr>
<tr>
<td>Magenta and Yellow or Black and Yellow</td>
<td>Radiation hazards</td>
</tr>
<tr>
<td>Black, White, or a Combination</td>
<td>Traffic movement cautions</td>
</tr>
<tr>
<td></td>
<td>• Aisles</td>
</tr>
<tr>
<td></td>
<td>• Housekeeping areas</td>
</tr>
<tr>
<td></td>
<td>• Similar areas</td>
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### Review the Following Points

- All workers should know the color codes.
- Your workplace codes should be posted and easy to see.
- In the standard code, red means DANGER.
- In the standard code, yellow means CAUTION.

### About These Modules

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Color Coding

True or False?

1. In the standard code, a first aid kit is green. T F
2. In the standard code, red means DANGER. T F
3. In the standard code, blue means CAUTION. T F
4. In the standard code, a stop bar would be green. T F
5. Clearly printed labels should be used with the color codes. T F
Dust and Mold for Trainers and Supervisors

Objective: Prevent respiratory illnesses caused by organic dust and mold.

**Trainer’s Note**

Workers in the green industry are often exposed to dust and mold that can cause respiratory illness. For this module:

- Review the information below on dust and mold hazards and ways to reduce exposure.
- Have workers identify the organic substances they handle and dust and mold hazards they face.
- Have workers discuss specific ways they can reduce exposure to dust and mold in their work.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Landscaping and horticultural work often involve peat, vermiculite, perlite, and mulch. Other organic substances may be frequent, too. Those organic substances produce dust when handled. Molds often grow naturally in the substances, too. Mold spores attach themselves to airborne dust particles.

All workers can be exposed to organic dust and mold. Greenhouse and nursery workers often get heavy exposure. Inhaling moldy dust from peat, vermiculite, perlite, mulch, or other substances can cause different diseases.

**Farmer’s Lung**

Farmer’s Lung is a noninfectious allergic disease. Basically, an individual becomes allergic to dust and mold. With Farmer’s Lung, the immune system cannot adjust to the mold spores. Farmer’s Lung has these symptoms:

- Fatigue
- Chills
- Shortness of breath
- Tightness in the chest
- Headache
• Irritating cough
• Loss of appetite

Respiratory symptoms vary with the amount and intensity of exposure. After a first reaction, a worker is likely to develop an increased sensitivity. Then, a worker can have a more severe reaction with fewer exposures.

In Chronic Farmer’s Lung, the reaction continues even after all the irritant is gone. It is possible to develop Chronic Farmer’s Lung after one acute attack. However, it usually develops slowly over time after repeated exposure. Contact a doctor if concerns about permanent lung damage arise.

**Organic Toxic Dust Syndrome**

Organic Dust Toxic Syndrome has similar symptoms but does not involve the immune system. Organic Toxic Dust Syndrome goes away after it runs its course. It often hits all the workers in a group at one time.

**Bronchitis and Asthma**

Exposure to organic dust and mold can cause bronchitis and asthma. Exposure can also aggravate existing bronchitis and asthma.

**Using Respirators or Dust Masks**

When using respiratory protection, select the appropriate Personal Protection Equipment for the task. A dust mask provides some protection if it is fresh, clean, and fit-tested. However, the best protection is a particulate respirator:

- Tested and certified by the National Institute for Occupational Safety and Health (NIOSH).
- With a Type 95, Type 97, Type 100, or HEPA filter.
- Fit-tested to ensure a tight seal between the facepiece and your face.

For more details, see the Tailgate Safety Training modules *Selecting a Respirator, Pesticide Exposure,* and *Respirator Fit.*

**Reducing Exposure to Dust and Mold**

- Identify dust and mold in the work site. Heavy concentrations of mold spores appear as dry white or gray powder or clouds.
- Minimize the amount and type of dust and mold in your work site.
- Avoid exposure to dust from decayed plants, leaves, mulch, and other materials.
• Limit exposure to all dust and mold.
• Work in a controlled site whenever possible.
• Use mechanical controls to remove dust and mold from the air, where feasible.
• Ventilate dusty areas.
• Move work outside whenever possible.
• Plan outside work to minimize dust exposure. Take natural factors into consideration:
  ♦ Wind direction
  ♦ Windy times of the day
  ♦ Using the dewpoint to settle the dust
• Avoid dusty work in confined areas.

Review These Important Points
• Wear a particulate respirator or dust mask when working with moldy mulches.
• Fit-test particulate respirators and dust masks.
• Work in a well-ventilated area.
• Use exhaust fans when possible to control exposure.
• Seek medical advice when concerned about exposure.
• Know the warning signs of Farmer’s Lung.
• Change ventilation filters on a regular schedule.

About These Modules
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Dust and Mold

Name____________________________________

True or False?

1. Dust and mold are major contributors to respiratory illness. T F
2. Use the appropriate Personal Protection Equipment for the job. T F
3. Plan outside work to minimize dust exposure. T F
4. Farmer’s Lung is a respiratory hazard only to farmers. T F
5. Particulate respirators are only needed when working indoors. T F
Electrical Shock for Trainers and Supervisors

Objective: Recognize the hazards of working around electricity.

**Trainer’s Note**

Workers should recognize the power and danger of electricity. Accidents happen due to ignorance. For this module:

- Teach the information about electricity below. Stress the hazards of electrical shock and how it can occur.
- Have workers identify hazardous situations in their work.
- Discuss the safety tips thoroughly.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Everyone must be aware of electricity and how it works. In particular, workers must know about proper grounding. Safety is always a priority. Voltage, current, grounding, and resistance are basic electrical terms:

- Voltage is the force that causes the current to flow.
- Current is the amount of electricity that is flowing.
- Resistance slows down or stops the flow of current.
- The greater the resistance, the less the amount of electrical flow.
- The grounding conductor is a connection between one electrical conductor and the source of electrical power.
- A neutral is the return path back to the source.

Electrical shock occurs when part of the body completes a circuit between conductors of different voltages or between an electrical source and a ground. When that happens, you might feel a tingling sensation. Take the tool out of service.

Wet skin has little or no resistance to electrical current flow and increases the danger of electrical shock or burns. A very small current can kill. A high voltage increases the risk of death. Avoid contact with exposed electrical conductors and connectors. Avoid contact with improperly insulated equipment. Damp or wet areas are dangerous.
The effect of electrical shock depends on the amount of current flow and the current’s path through the victim’s body. People have survived shocks of several thousand volts. Others have been killed by voltages as low as 12 volts. To prevent electrical shock, make sure that your body does not become part of the electrical flow and a path for the current.

Ground Fault Circuit Interrupters (GFCIs) are required in greenhouses and nursery operations where electricity, water, and grounds are intermingled. GFCIs quickly shut off the power at the receptacle. Other work areas may also have GFCI protection. For more details, refer to the Tailgate Safety Training module *Grounding Electricity.*

**Helping an Electrical Shock Victim**

An important part of electrical safety is knowing how to help an electrical shock victim.

- Call for help immediately.
- Often, a victim is unable to pull away from the current source. Stop the flow of electricity in the victim’s body — disconnect or de-energize the circuit.
- **Do not** try to remove the victim from the current source. Touching the victim could cause you to be shocked as well.

**Safety Tips**

- Wet skin can greatly decrease your resistance to electricity.
- Inspect the area for electrical hazards.
  - Watch for damaged extension cords.
  - Watch for exposed electrical wires.
  - Watch for damaged electrical boxes.
- Avoid contact with overhead wires if you are working with long objects up in the air — ladders, pruning shears, pruning saws.
- Do not overload circuits.
- Keep electrical equipment away from water and dampness.
- Check electrical cords for fraying and signs of wear.
- Be sure to lock out/tag out switches when working on equipment.
- In case of an electrical fire, shut off the power.
- Use a fire extinguisher approved for electrical fires to fight the fire.
- Never use water to put out an electrical fire. Water can result in a fatal shock.
- GFCIs are designed to keep workers from being electrocuted, so workers must use them when needed.
  - Use a GFCI when operating hand-held portable tools with an extension cord.
  - Use GFCIs when equipment is used near water or wet areas.
  - Test GFCIs frequently.
- Multi-plug adaptors should have circuit breakers or fuses.
- Use only double-insulated power tools or equipment with three-prong plugs. Never use the equipment with one of three prongs broken.
- If you feel a tingling sensation while you are using a tool, stop using the tool immediately. Take it out of service.

**Review These Important Points**

- Voltage, current, and resistance are basic electrical terms.
- Electrical shock occurs when a part of the body completes a circuit between conductors of different voltages.
- Proper insulation of electrical sources and proper grounding work together for safety.
About These Modules

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Electrical Shock

Name____________________________________

True or False?

1. Never use a hand tool that has the ground prong broken off the plug-in end. T F
2. Be sure to tag out and lock out equipment switches. T F
3. If you feel a tingling sensation while using a hand tool, it should be taken out of service. T F
4. The higher the voltage, the higher the risk for workers. T F
5. Wet skin makes it easier for electricity to enter the body. T F
Equipment and Plant Transport for Trainers and Supervisors

Objective: Transport equipment and plants safely.

**Trainer’s Note**

Many landscaping and horticulture businesses use trucks and trailers to transport equipment and plants to work sites. For this module:

- Review the information below on securing equipment and plants on trailers and on safe driving with trailers.
- Demonstrate to workers the proper way to secure equipment and plants.
- Demonstrate the proper way to drive while towing a trailer. Demonstrate how to back a trailer.
- Ask workers if they have any questions after reviewing the module.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Many landscaping and horticultural businesses use trucks and trailers to transport equipment and plants to work sites. Types of equipment can include lawn mowers, both push type and riding type; small backhoes; tractors, etc. You should know safe procedures to:

- Secure equipment on a truck bed or trailer.
- Perform a safety check before driving.
- Drive while towing a trailer.
- Secure plants or small trees for delivery to a work site in a truck bed or a trailer.

**Securing Equipment for Safe Transport**

- While loading or unloading a truck or trailer, be sure that the parking brake is set and that the wheels are chocked. This will keep the truck or trailer from accidentally moving while it is being loaded or unloaded. For more details, see the Tailgate Safety Training module *Chock and Block*.
- Always make sure the load is properly balanced. An unbalanced load can cause a trailer to sway and be hard to control. An unbalanced load could cause a traffic accident.
- Only use a truck or trailer that has side rails.
• Use chains or straps with ratchet load binders to secure the equipment to the bed. A chain or strap with a ratchet type binder will ensure that the equipment is securely anchored to the bed.
• Always make sure that gasoline cans are secure and not loose in the bed.
• Secure tools such as rakes, shovels, hoes, picks, ladders, etc., with tie down straps or bungee cords. Never leave these tools unsecured in the bed or trailer.

**Securing Plants for Safe Transport**

• While loading or unloading a truck or trailer, be sure that the parking brake is set and that the wheels are chocked. This will keep the truck or trailer from accidentally moving while it is being loaded or unloaded. For more details, see the Tailgate Safety Training module *Chock and Block*.
• Always make sure the load is properly balanced. An unbalanced load can cause a trailer to sway and be hard to control. That could cause a traffic accident.
• Plants can be heavy, so use proper lifting techniques. For more details, see the Tailgate Safety Training modules *Preventing Lifting and Over-Exertion Injuries* and *Repetitive Motion*.
• Only use a truck or trailer that has side rails.
• Use tie down straps or bungee cords to secure plant pallets or flats to the bed of the truck or trailer. This will reduce the chance of the load shifting.
• If necessary, attach a cargo net over the load.
• If small trees or tree saplings are being transported, secure them in an upright position using tie-down straps or bungee cords.

**Trailer Towing Safety Tips: Before You Start**

• Make sure that the weight of the equipment being loaded does not exceed the Gross Combination Weight Rating. This information should be stated on the trailer itself or in the operator’s manual. If you are not sure, ask your employer.
• Use the proper hitch.
• Check the hitch and the ball to make sure they are properly secured. Make sure the safety chains are in place. Lock the hitch with a padlock and bar.
• Check tail lights, running lights, directional signals, and brake lights. Replace any burned out bulbs before towing the trailer.
• If the trailer has its own braking system, check the braking system before towing.
• Check the truck mirrors so that you have good side and rear visibility.
• Check the tire pressure and tread wear on the truck and trailer tires.
• Make sure the load is properly secured and balanced.
• After the safety check, report any problems to your employer.

**Trailer Towing Safety Tips: On the Road**

• Avoid jerky starts or fast acceleration. This can cause the load to shift.
• While driving, avoid sharp turns. Normal turns should be wider to prevent jackknifing or curb jumping.
• Never exceed the speed limit when towing a trailer.
• Always use turn signals when changing lanes and allow plenty of distance when changing lanes.
• Always come to a stop gradually. Avoid sudden stops.
• Be aware of crosswinds. Crosswinds can cause the trailer to drift into another lane.
• Be alert when you are passed by large trucks or semi trucks. The wind they produce can cause the trailer to sway. As they pass, reduce your speed gradually. Do not speed up. Steer straight ahead.
• Occasionally check the position of the trailer using the truck mirrors.
• Remember that a loaded trailer handles differently than an empty trailer.
• Always have proper identification while operating a company vehicle.
• Once you have reached the work site and have stopped, set the parking brake and chock the trailer wheels before unloading. For more details, see the Tailgate Safety Training module *Chock and Block*.

• If you have to back the trailer, use opposite steering procedures. It is a good idea to practice backing a trailer. Always back slowly. Sharp turns can result in the trailer jackknifing. If necessary, have another worker outside the truck help you back the trailer by using hand signals. For more details, see the Tailgate Safety Training module *Hand Signals for Vehicle Safety*.

**Review These Important Points**

• Always set the parking brake and chock the wheels before loading or unloading a trailer.
• Always make sure the load is properly balanced and secured.
• Secure all small tools with bungee cords or tie down straps.
• Use proper lifting techniques when manually loading and unloading.
• Do a safety check before towing a trailer.
• Obey all traffic laws while towing a trailer.
• Drive slowly while backing a trailer. Avoid sharp turns.

**About These Modules**

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Equipment and Plant Transport

True or False?

1. If the parking brake is set, you do not have to chock the trailer wheels. T F

2. Use chains or straps with ratchet binders to secure equipment to the trailer bed. T F

3. It is okay to overload the trailer if you are only going a short distance. T F

4. A trailer always tows the same whether it is loaded or empty. T F

5. You do not need proper identification if you are driving a company vehicle. T F
Equipment with Cutter Bars and Blades
for Trainers and Supervisors

Objective: Use safe procedures to work with and unclog machinery with cutter bars or blades.

Trainer’s Note

Safety must always be the first priority for machinery with cutter bars or blades. For this module:

• Conduct this session in the shop or the field.
• Have equipment available to show the proper way to disengage and unclog cutters.
• Review the information below on service and maintenance needs.
• Review the important points.
• Have workers take the True/False quiz to check their learning.

Background

Equipment with cutter bars or blades includes sickle cutter bars, rotary disk cutting blades, and hand-held powered cutting devices. When using cutting equipment, the operator should be familiar with the mechanisms and safety precautions.

Working with Cutter Bars and Blades

• Keep hands and feet away from the cutter bar or blade when the machine is running. Shut off the power before unclogging, servicing, or moving the machine.
• Mowers with rotating disks can throw objects. Do not operate when bystanders are near. Thrown objects can cause serious injury.
• Use the mower safety curtain or cover when operating the cutter bar or blades. Safety curtains prevent objects from being thrown by the rotating disks.
• Safety curtains may not catch all flying objects. Use personal eye protection to prevent injury from anything thrown — personal eye protection, protective gloves, and hard hats. (For more details, see the Tailgate Safety Training modules Personal Eye Protection, Protective Gloves, and Protecting the Head.)
• Tractors with cabs offer additional protection from thrown objects.
• Keep knives and fastening hardware in good condition. This prevents knives from being thrown from the machine. Consult the operator’s manual for directions.
Follow These Steps to Safely Unclog the Cutter Bar or Blade and Remove Debris

• Stop and disengage the power-take-off (PTO) or drive clutch.
• Raise the cutting and mowing device and back up.
• Move the machine clear of the accumulated debris.
• Shut off the engine. With the parking brake engaged, shift the transmission into park or neutral.
• Pull the clogged debris away from the cutter bar or blade.
• Check the cutter bar or blade for broken or damaged parts.
• Return the safety curtain or cover to the proper operating position.
• Start the engine. Engage the PTO at low speed. Then increase it to the rated speed.

Knives and rotating disks on cutter bars and blades can cause severe injury if used improperly. Rocks or other debris thrown by rotating disks, blades, and knives can injure the operator or bystanders. Follow all safety precautions.

Review These Important Points

• Always disengage the PTO before attempting to service any cutting device.
• Use and maintain all machine shields and covers.
• Use personal eye protection as added protection.
• When pulling debris out of cutter bars or blades, pull away from the knives.

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Equipment with Cutter Bars and Blades

True or False?

1. Cutter bar or blade knives and rotating disks can severely injure people and animals.  
   T  F

2. When pulling debris out of cutter bars or blades, always pull debris away from the knives.  
   T  F

3. There is no need to disengage the PTO before servicing a cutter bar or blade.  
   T  F

4. Shields that are lost or broken do not need to be replaced.  
   T  F

5. A tractor with a cab is the best way to avoid injury from objects thrown by machinery with cutter bars or blades.  
   T  F
Federal DOT Placarding for Trainers and Supervisors

Objective: Follow required guidelines for federal DOT placarding.

**Trainer’s Note**

A vehicle carrying hazardous materials, or HAZMAT, can be in an accident. Then there is a real danger. For this module:

- Review the information below on types of HAZMAT and requirements for placards and shipping papers.
- Show workers a vehicle that meets required guidelines for placards and shipping papers.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

What are hazardous materials, or HAZMAT? According to the Environmental Protection Agency (EPA), HAZMAT is any substance that has corrosive, ignitable, reactive, or toxic properties. HAZMAT can harm people or the environment when handled improperly. HAZMAT must be stored separately from non-hazardous materials. HAZMAT must be disposed of separately. And HAZMAT must be documented separately.

HAZMAT commonly used in landscaping and horticulture includes:
- Fertilizers and pesticides
- Paints and solvents
- Fuels like gasoline, liquid propane (LP) gas, or heating oil

Under most circumstances, HAZMAT poses little risk to the surrounding area. But nursery operators, sod farmers, large growers, or landscapers might haul HAZMAT on the road. If there is an accident, the HAZMAT can spill or catch fire. This would put the driver, the emergency response teams (ERTs), and the surrounding area in danger. ERTs must identify the HAZMAT quickly.

The U.S. Department of Transportation (DOT) developed a system to help ERTs identify HAZMAT quickly. The system includes two parts:
- DOT placards like signs, labels, and signals.
- Proper placement of shipping papers.

ERTs are trained to look for warning signs and labels, so HAZMAT must have placards. The placards must be correct. With no placards or the wrong ones, lives are in jeopardy.
Placarding

Placards identify hazard classes. Placards must be placed on all four sides of a vehicle hauling more than 1,000 pounds of HAZMAT. There are exceptions, however. Explosive chemicals (Class 1) must always have placards regardless of weight.

Shipping Papers

Suppliers provide shipping papers. The papers must be with a driver hauling HAZMAT. ERT crews must be able to find the shipping papers quickly in an accident.

- Papers should be in a separate envelope.
- Papers should be visible. They should be within the driver’s reach when restrained by a seat belt. They may also be in a pouch on the driver’s door.
- When the driver is not in the vehicle, they should be in the driver’s door pouch or on the driver’s seat.

Liabilities

DOT regulations cover anyone hauling HAZMAT in a vehicle on a public road. There may be some exceptions when crossing a road between adjacent properties. The driver must have a special driver’s license. In case of an accident, the driver may be held liable if the proper license or shipping papers are not present. The driver may be liable if the load is not properly placarded. Contact a lawyer for specifics of potential liability.

Review These Important Points

- DOT placards and shipping papers are extremely important in case of an accident hauling HAZMAT.
- Placards that quickly identify the HAZMAT should be placed on all four sides of the vehicle.
- The driver and ERT crews should be able to find shipping papers easily.
- HAZMAT with no placards can endanger lives.
- HAZMAT with the wrong placards can endanger lives.

About These Modules

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Federal DOT Placarding

Name____________________________________

True or False?

1. Shipping papers should be carried in a separate envelope. T F

2. The shipping papers should be kept under the seat so they are out of the way. T F

3. Placards should be placed on all four sides of a vehicle hauling more than 1,000 pounds of HAZMAT. T F

4. ERTs are trained to look for DOT placards and HAZMAT shipping papers. T F

5. In the case of an accident, drivers may be held liable if they do not have shipping papers or proper placards for HAZMAT. T F
First Aid Kit for Trainers and Supervisors

Objective: Identify the location and contents of a first-aid kit.

**Trainer’s Note**

First-aid kits are the first line of defense against injury. For this module:

- Present the information below on contents of a first-aid kit.
- Discuss procedures to use if a serious accident occurs.
- Show workers the locations and contents of first-aid kits in your workplace. Ask employees to suggest additional kit items.
- Invite a health-care professional to participate in this session.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Note:** Review the location and the contents of the kit prior to training. Check for outdated or missing items.

**Background**

Knowing how and what types of first aid to use can prevent a more serious injury. Keep a Red Cross First Aid manual with the first-aid kit.
The Red Cross suggests that the kit include:

- Poison first-aid kit with syrup of Ipecac and charcoal
- Sterile first-aid dressings in sealed envelopes (2" x 2" for small wounds, 4" x 4" for larger wounds and for a compress to stop bleeding)
- Tongue blades
- Bandage scissors
- Tweezers
- Eye wash solution
- Thermometer
- Safety pins
- Ace bandage
- Safety pins
- Tongue blades
- Band-aids
- Roller bandage, 1" x 5 yards (for finger)
- Roller bandage, 2" x 5 yards (to hold dressings in place)
- Adhesive tape
- Triangular bandages for a sling or as a covering over a larger dressing
- Cotton balls for cleaning wounds or applying medication
- Splints 1/4" thick, 1/2" wide, and 12 to 15" long for splinting broken arms and legs
- 70 percent isopropyl alcohol and tincture of green soap in a covered container for cleaning
- Ice packs (chemical ice bags) to use to reduce swelling
- Insect bite kit
- Several pairs of disposable gloves
- Waterless hand wash

There are many types of first-aid kits available. Keep and maintain an appropriate kit on each major piece of equipment, trucks, and cars and in the garage or shop. Kits should be inspected at least twice a month and replenished as necessary.

The Red Cross suggests that workers be certified in emergency cardiopulmonary resuscitation (CPR), the method used to restore heartbeat and breathing. CPR may save the life of someone who has been injured or suffers a serious illness. However, CPR and first aid take training. An untrained individual who gives CPR or first aid may cause harm.

Having an emergency plan in place saves time during an accident. Have a plan for every work location, including machinery sheds, garage, greenhouses, and fields. Know and practice what to do in case of an emergency.

**If a Serious Accident Occurs**

- Stay calm and try to calm the victim.
- Shout or radio for help and tell a specific person to call 911 for Emergency Medical Service (EMS).
- Evaluate the victim’s condition and administer first aid or CPR as needed. (Only trained individuals should administer CPR first aid). Continue treatment until relieved by the EMS personnel.
- Do not move the victim except to protect the victim from further injury.
- Remain with the victim.
- Conduct a quick rescue without risking personal safety.
When calling 911, give the dispatcher the information listed here and remain on the phone until the information is confirmed and the dispatcher says to hang up:

- Location of and directions to the emergency
- Type of emergency
- Number of victims
- Location phone number
- Treatment given to the victim(s)

**Review These Important Points**

- Have a complete first aid kit on all major implements and in all work locations.
- Learn first aid and CPR.
- Know the emergency medical plan and keep it current.
- Know the 911 number and accident information.

**About These Modules**

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First Aid Kit

Name____________________________________

True or False?

1. Anyone can give proper first aid in an emergency. T F
2. Knowing CPR can save precious seconds and may mean the difference between life and death. T F
3. Every business should have an emergency accident plan. T F
4. Keep a Red Cross First Aid manual with each first-aid kit. T F
5. CPR can save lives. T F
First on the Scene for Trainers and Supervisors

Objective: Develop crisis intervention skills.

Trainers Note

Those who are first on the scene of an accident play a critical role. For this module:

• Present the information below on what to do when you are first on the scene.
• Have workers give examples of their own experiences as first on the scene; relate your experiences too.
• Review the important points.
• Have workers take the True/False quiz to check their learning.

Background

When an accident happens in the green industries, rescues are often more difficult:

• Equipment is very rugged. Standard rescue equipment, such as hydraulic rescue tools and metal-cutting saws, easily removes automobile pieces but may not work on more solidly built machinery.
• The accident scene may be a remote location.
• Access to the scene may be poor.
• Rescue workers may not be familiar with green industry operations.

When You Are First on the Scene

Intervention should never endanger the rescuer or bystanders or put the victim in graver danger. If possible, put an emergency phone number in speed dial. Or post emergency phone numbers near all phones. A local volunteer fire department or emergency rescue squad member would be an ideal trainer.

• Designate a leader. A worker who has had first-aid training or the senior worker should assume leadership. This person should direct the rescue until the emergency squad arrives and should update the squad on treatment administered.
• Assign a specific person to call for help. The ambulance dispatcher will need to know the location and condition of the scene (muddy, steep, rough), type of equipment involved in the accident, number of victims, and the extent of their injuries.
• **Assess the rescue situation.** Evaluate the situation and develop an escape plan. Stabilize equipment to minimize the chance of collapse or further injury. Know the limitations of the helpers and available equipment.

• **Establish a hazard zone.** Only the rescuers should be in the area. Keep all others out of danger and out of the way. The scene may contain hazards such as fire, toxic or flammable gases, chemicals, pesticides, and structural damage.

• **Provide emergency first aid.** Restore breathing and circulation if necessary. If there is bleeding, apply pressure to related pressure points. Administer any additional first-aid treatment.

• **Provide ventilation.** In a confined space, the victim may need clean fresh air — for example, in an injury during pesticide application inside a greenhouse.

• **Stay calm.** Calm the victim by keeping one rescuer near the victim at all times.

• **If amputation occurs:** Locate the appendage and wrap it in a moist towel. Keep it on ice, but do not let it freeze. If the appendage is in pieces, send each piece to the hospital as it is found.

**Review These Important Points**

- Appoint a worker to lead until the emergency squad arrives.
- Call for emergency help as quickly as possible.
- Assess the situation and start first aid.
- Establish a hazard zone.
- Locate any appendage and transfer to the care unit.

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First on the Scene

Name____________________________________

True or False?

1. Someone should take the leadership of the rescue activity as soon as possible. T F

2. If additional help is needed, do not hesitate to call. T F

3. After locating a missing appendage, wrap it in a moist towel and place it on ice. T F

4. Plan the rescue and then take action. T F

5. One rescuer should remain with the victim at all times. T F
Forklift Safety for Trainers and Supervisors

Objective: Operate forklifts safely.

**Trainer’s Note**

When forklifts are used improperly, serious accidents can occur. For this module:

- Review the information below on forklift safety procedures.
- Have an experienced operator train new workers on forklift safety.
- Show workers the areas of the workplace where a forklift would be used.
- Point out areas where hazards and accidents might occur. Encourage workers to also point out possible hazards and accident sites.
- Discuss any questions workers might have.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

A forklift or powered industrial truck can be dangerous if operated by untrained workers. The driver or bystanders can be seriously injured or killed if an accident should occur. Forklifts can also cause damage to the employer’s property. Good safety procedures for operating a forklift should be followed at all times.

**Safety: Before Operating**

- Do not operate a forklift if you have not been properly trained in all operations and safety procedures.
- Never operate a forklift without permission from a supervisor.
- Check brakes, steering, controls, forks, hoist, fire extinguisher, warning devices, and lights at the beginning and end of each shift. Do not operate a forklift if any item on the checklist fails inspection. Report all problems to your supervisor.
• Pay attention to maximum load limits. Never overload.
• All forklifts should be equipped with a multi-purpose dry chemical fire extinguisher.

Safety: During Transport

• **No riders on forklifts!**
• Make sure the load is balanced before and during transport.
• Check the ground or floor for uneven areas and debris.
• Always travel at a safe speed.
• Tilt the forklift masts back when driving the forklift. This will lessen the chance of the load becoming unbalanced.
• Never reach through the mast for any reason. If a load has shifted, stop the forklift, lower the forks, put the forklift into park, and set the brake. If necessary, have another worker help you reposition the load.
• Keep the forks about 4 to 6 inches above the ground when moving a load.
• If you cannot see because of the size of the load, drive in reverse slowly. If necessary, have another worker guide you and serve as a lookout.
• Use standard hand signals for communication. For details, see the Tailgate Safety Training module *Hand Signals for Vehicle Safety*.
• Do not speed. The forklift should be driven at about 5 miles per hour. This speed is the same as a normal walk.
• Watch out for other forklifts and workers.
• Always back the forklift down a ramp. Keep the load in front when going uphill.
• Always keep your head, arms, and legs inside the driving compartment.
• Operators should always wear hard hats in high lift areas.
• Never lift people.
• Never lift a load above workers. Never allow workers to stand under a raised load.
• Sound the horn when approaching a corner.
• Remember that when you turn a corner, the rear of the forklift makes a wide swing. Watch for clearance on both sides of the aisle.
• Check side and overhead clearances when loading and unloading.
• Watch for water, oil, or other liquids on the floor. Report any wet surface to your supervisor.
• Watch out for overhead hazards such as pipes, beams, lights, sprinklers, door casings, cable wires, and signs.
• Always be careful around loading docks. Do not operate the forklift too close to the edge of the dock. Many forklift accidents occur when a forklift backs off a dock. For more details, see the Tailgate Safety Training module *Loading Docks and Warehouses*.
• Do not turn the wheels too fast. This can cause the forklift to overturn.

Safety: Stacking Materials

• Always stack materials so they are tied in. For example, if you have six loads to stack, put three on the floor, two on the second tier, and one on the top. This forms a pyramid and lessens the possibility of materials falling.
• Do not stack materials too high. This can cause materials to fall.
• Make sure that stacked materials do not block the building’s sprinkler system.

Review These Important Points

• All employees need to be properly trained before operating a forklift.
• Do a forklift safety check before and after each shift.
• Do not overload the forklift.
• Check all clearances while operating a forklift.
• Watch out for other forklifts and workers while operating a forklift.
• Never allow anyone to ride on the forklift.
• Use caution when turning corners.
• Never speed while operating a forklift.
• Always be alert around loading docks.

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Forklift Safety

True or False?

1. You should be trained before operating a forklift.  T  F
2. Always back a forklift down a ramp.  T  F
3. Always keep your head, arms, and legs inside the driving compartment.  T  F
4. Keep the forks about one foot off the ground.  T  F
5. It is okay to lift someone if the situation is work-related.  T  F
Gas Welding Safety for Trainers and Supervisors

Objective: Weld using safe practices and Personal Protection Equipment (PPE).

**Trainer’s Note**

Gas welding is an important but dangerous task. For this module:

- Present the information below on hazards and safe practices in gas welding.
- Demonstrate safe storage and handling practices.
- Supervise workers as they practice safe storage and handling.
- Demonstrate Personal Protection Equipment (PPE) and have employees try it on.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Many operations have some type of equipment to weld and cut metals. Acetylene is the most commonly used fuel gas. Oxygen helps other objects burn and creates fire hazards. Acetylene and oxygen both present hazards, however.

- Acetylene is very flammable and can ignite in different concentrations.
- Oxygen cylinders contain enriched oxygen compared to the air; they can turn a spark into a life-threatening hazard.
- Cylinders can also rupture.
- A cylinder can shoot through the air like a rocket if its valve is damaged or broken.

**Storage and Handling**

- Keep gas and oxygen cylinders at least 20 feet apart when not in use. Or separate them with a proper firewall.
- Store cylinders away from other flammable and combustible materials.
- Store extra gas and oxygen cylinders separately — at least 20 feet apart or separated by a proper firewall.
- Keep cylinders away from physical damage, heat, and tampering.
- Store cylinders in an upright position. Chain them securely to keep them from falling over. Chain the welding rig securely to prevent it from falling as well.
- Close cylinder valves before moving.
• Protective caps or regulators should be kept in place.
• Roll cylinders on bottom edges to move. Do not drag.
• Minimize cylinder movement when transporting.

General Gas Welding Safety Tips

• Lift gas cylinders only with equipment designed for that use.
• Inspect torches and clean only with the proper tools.
• Use only torches that have blow-back protection.
• Inspect equipment for leaks at all connections using approved leak-test solution.
• Inspect hoses for leaks and worn places.
• Replace bad hoses.
• Have a fire extinguisher easily accessible at the welding site.
• Protect hoses and cylinders from sparks, flames, and hot metal.
• Use a flint lighter to ignite the flame.
• Stand to the side (away from the regulators) when opening cylinder valves.
• Use two-stage regulators whenever possible.
• When using a single-stage regulator, open cylinder valves very slowly. This keeps sudden high pressures from exploding the regulators.
• When using a single-stage regulator, only open the acetylene cylinder valve 1/4 to 3/4 turn.
• Leave the wrench in place. That way, you can close the cylinder quickly in an emergency.
• Open and light the acetylene first. Then open and adjust the oxygen to a neutral flame.
• When shutting off the torch, close the acetylene torch valve first. You might hear a pop as the oxygen blows out the flame, but the flame will not burn up the acetylene line.
• When finished:
  ♦ Close cylinder valves.
  ♦ Bleed the lines to take pressure off the regulators.
  ♦ Neatly coil hoses.
  ♦ Replace equipment.

Personal Protection Equipment (PPE)

• Infrared radiation can cause retinal burning and cataracts. Protect your eyes with safety glasses.
• Protect your body from welding spatter and arc flash with protective clothing:
  ♦ Woolen clothing (possibly cotton) — never synthetic!
  ♦ Welding jackets
  ♦ Flame-proof apron
  ♦ Gloves
  ♦ Properly fitted clothing that is not frayed or worn
  ♦ Long-sleeve shirts
  ♦ Straight-leg trousers that cover shoes
  ♦ Fire resistant cape or shoulder covers for overhead work
  ♦ Leathers to protect specific body parts or areas
• Check protective clothing equipment before each use. Make sure it is in good condition.
• Keep clothes free of grease and oil.

Proper Ventilation

Be sure there is adequate ventilation available when welding in confined areas or where there are barriers to air movement. Natural drafts, fans, and positioning of the head can help keep fumes away from the welder’s face.
Ventilation Is Sufficient If

- The room or welding area contains at least 10,000 cubic feet for each welder.
- The ceiling height is not less than 16 feet.
- Cross-ventilation is not blocked by partitions, equipment, or other structural barriers.
- Welding is not done in a confined space.

If these space requirements are not met, mechanical ventilating equipment must be used. Equipment must exhaust at least 2,000 cubic feet of air per minute for each welder, except where local exhaust hoods or booths or air-line respirators are used.

Review These Important Points

- Proper Personal Protection Equipment is important.
- Acetylene is very flammable.
- Inspect all equipment before welding.
- If ventilation is not sufficient, then the welding area should be equipped with mechanical ventilating equipment.
- Always have a fire extinguisher ready for immediate use.

About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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**Answer Key**

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</table>
Gas Welding Safety

True or False?

1. The acetylene torch valve should be closed first when shutting off the torch.  T  F
2. When moving cylinders they should be rolled on their bottom edges.  T  F
3. Oxygen in the air is more flammable than oxygen in a cylinder.  T  F
4. Extra gas and oxygen cylinders may be stored together.  T  F
5. Personal Protection Equipment needs to be worn when welding.  T  F
Grounding Electricity for Trainers and Supervisors

Objective: Work safely around electricity on the job.

**Trainer’s Note**

Working with electricity can be dangerous. This danger comes from a combination of things — voltage, amperage, resistance to the flow of the current, and duration of contact. Demonstrate the use of proper and improper grounding. For this module:

- Review the information below on electricity, hazards, and safety guidelines.
- Demonstrate proper and improper grounding.
- Explain the difference between 120-volt and 240-volt outlets using the illustration.
- Have workers inspect and test power tools for proper grounding.
- Also, demonstrate a Ground-Fault Circuit Interrupter (GFCI).
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Electricity always follows one or more paths of least resistance. Electricity follows a nonstop path. If the body becomes part of a path, electricity will pass through it. Dry hands and feet offer more resistance to electrical current than wet hands or feet. But the current can be lethal in either case — especially if the electricity passes through vital organs like the heart or lungs.

Grounding electricity means creating an easy path for the current — one that doesn’t include your body.

**For Your Safety**

- Have only a qualified electrician perform electrical installations or repairs.
- Moisture and electricity must never mix.
- Unplug tools immediately after use.
- Do not use water to put out an electrical fire.
- Electrical fires require a type C fire extinguisher.

The diagram on the following page shows a 120-volt (120V) outlet and one type of 240-volt (240V) outlet.
Electrical power tools should have a true ground. Otherwise, they should be double-insulated. For example, a drill has a third wire incorporated in the design. This third wire acts as the ground wire. This means the current will follow the ground wire — not the operator. Usually a three-prong plug in a three-hole outlet provides a proper ground. Never cut off the third ground prong.

If you have an old system with only two-prong plugs, it is not properly grounded. In that case, you must use an acceptable double-insulated electric power tool. Never use a spare piece of wire attached to a pipe or outlet housing as the ground. If a power tool develops a short, repair it before using it again.

Check that portable electric hand tools are properly grounded

Inspect Wires and Connectors

- Inspect wires and plugs on power tools before each use. Repair or replace damaged wires or plugs before using the equipment. Do not tape over gashes. Instead, replace the wire. Do not splice wires.
- Extension cords are for temporary use. Have permanent wiring installed where needed. Where an equipment cord plugs into an extension cord, tie a half-knot to keep the plug from pulling out.
- Extension cords should be appropriate for outdoor use. The electrical load should not exceed the rated capacity. Use only one extension cord.
- Never use an electrical power tap or power strip for landscape and horticultural use. It is too easy to overload it. It may melt.
- Shield plugs and outlets. Protect plugs and outlets from moisture in the environment. Never leave a plug connection in a puddle or other collection of water.
- Only use one hand when touching plugs, outlets, or anything metal in a greenhouse. Water and electricity are both abundant. If you touch with both hands, the electric charge can pass across your heart. You could be electrocuted. You could die.

Circuit Breakers

Overloads can cause fires. Circuit breakers protect the wiring system from an overload. They do not protect people.
Ground-Fault Circuit Interrupter

A Ground-Fault Circuit Interrupter (GFCI) is specifically for people safety. A GFCI can be hard-wired into an electrical box. A portable GFCI can also be plugged into any electrical outlet. If there is an electrical short, the GFCI prevents an electrocution.

Review These Important Points

- Electricity always follows one or more paths of least resistance.
- Use an effective ground.
- Only electricians should make electrical installations or repairs.

About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Grounding Electricity

Name____________________________________

True or False?

1. Never use a wire attached to a pipe to act as the ground. T F
2. Electricity always follows one or more paths of least resistance. T F
3. If the ground prong is broken off the hand tool plug-in end, it should be taken out of service. T F
4. If your body becomes part of the circuit, electricity will pass through it. T F
5. If a person comes in contact with electricity, they may be electrocuted. T F
Hand Signals for Vehicle Safety for Trainers and Supervisors

Objective: Identify and use the correct hand signals when working under noisy conditions.

**Trainer's Note**

The American Society of Agricultural Engineers has adopted 11 uniform hand signals for safety. All workers, including delivery drivers and other workers who are at the job site, should learn the 11 signals and use them. That way, everyone will communicate in the same “language.” For this module:

- Demonstrate the signals in your tailgate presentation.
- Have someone else discuss how to perform the signal while you demonstrate the hand signal.
- Have workers practice them.
- You could post the hand signals in the coffee room or near a water fountain. This will allow employees to see the signals every day.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Hand signals are ideal for communication around noise. Hand signals provide a way to communicate needed information effectively in a noisy environment. All workers should learn and use these signals.

**Why Use Hand Signals?**

- Hand signals save time.
- Hand signals prevent accidents.
- Hand signals reduce severity of injuries.
- Hand signals lower the risk of accidental death.
- Hand signals communicate well in noisy environments.

The American Society of Agricultural Engineers (ASAE) has adopted 11 uniform hand signals for safety. The signals help workers communicate in the same “language.” The chart on the next page shows the 11 signals. With each hand signal there are detailed instructions for performing the signal.
<table>
<thead>
<tr>
<th><strong>COME TO ME</strong></th>
<th><strong>MOVE TOWARD ME</strong></th>
<th><strong>THIS FAR TO GO</strong></th>
<th><strong>STOP</strong></th>
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<tr>
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<tr>
<td>Raise the arm vertically overhead, palm to the front, and rotate in large horizontal circles.</td>
<td>Point toward person(s), vehicle(s), unit(s); beckon by holding the arm horizontally to the front, palm up, and motioning toward the body.</td>
<td>Place palms at ear level, facing head, and move laterally inward to indicate remaining distance to go</td>
<td>Raise the hand upward to the full extent of the arm, palm to the front. Hold that position until the signal is understood.</td>
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</table>

<table>
<thead>
<tr>
<th><strong>LOWER EQUIPMENT</strong></th>
<th><strong>RAISE EQUIPMENT</strong></th>
<th><strong>START ENGINE</strong></th>
<th><strong>STOP ENGINE</strong></th>
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<td>Make circular motion with either hand pointing to the ground.</td>
<td>Make circular motion with either hand at head level.</td>
<td>Simulate cranking of vehicles by moving arm in circular motion at waist level.</td>
<td>Draw either hand, palm down across the neck in a “throat-cutting motion.”</td>
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<table>
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<tr>
<th><strong>SLOW DOWN</strong></th>
<th><strong>SPEED UP</strong></th>
<th><strong>MOVE OUT</strong></th>
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<td>Extend the arm horizontally sideward, palm down, and wave arm downward 45 degree minimum several times, keeping the arm straight. Do not move arm above horizontal.</td>
<td>Raise the hand to the shoulder, fist closed; thrust the fist upward to the full extent of the arm and back to the shoulder rapidly several times.</td>
<td>Face the desired direction of movement; hold the arm extended to the rear; then swing it overhead and forward in the direction of desired movement until it is horizontal palm down.</td>
</tr>
</tbody>
</table>
Review These Important Points

- Hand signals are an ideal communication tool for noisy situations.
- There are 11 ASAE uniform hand signals.
- Hand signals help save time and prevent accidents.
- Using hand signals could save a life.
- Review each signal with employees.

About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Hand Signals for Vehicle Safety

Name____________________________________

True or False?

1. To signal to stop, you should raise your hand upward to the full extent of the arm, palm to the front. T F

2. Only the owner needs to know the hand signals. T F

3. There are 11 uniform ASAE hand signals. T F

4. Using the standard hand signals can save time and prevent accidents. T F

5. To indicate that the equipment needs to be lowered, make a circular motion with either hand pointing to the ground. T F
Heat Stress for Trainers and Supervisors

Objective: Describe symptoms of heat stroke and heat exhaustion and explain emergency procedures for both.

**Trainer’s Note**

Heat stress is serious. It can lead to serious, permanent damage or death. For this module:

- Provide copies of the OSHA Quick Card on Heat Stress shown on the following page, available online from http://www.osha.gov/Publications/osha3154.pdf.
- Review the information below on heat exhaustion and heat stroke.
- Discuss measures to prevent heat stress and appropriate emergency procedures.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Controlling heat stress is very important to pesticide workers and early entry workers. Early entry workers go into an area while entry is restricted after pesticide treatment and must wear protective gear. However, heat stress can affect anyone!

Heat stress is a buildup of body heat caused either internally by muscle use or externally by the environment. Sometimes, the body is overwhelmed by heat. If so, heat exhaustion and heat stroke result. As the heat increases, body temperature and the heart rate rise painlessly. An increase in body temperature of two degrees Fahrenheit can affect mental functioning. A five degree Fahrenheit increase can result in serious illness or death. During hot weather, heat illness may be an underlying cause of other types of injuries, such as heart attacks, falls, and equipment accidents.
The most serious heat-related illness is heat stroke. The symptoms are confusion, irrational behavior, convulsions, coma, and death. More than 20 percent of heat stroke victims die regardless of health or age. Younger workers seem to be more susceptible to heat stroke than adults.

One side effect of heat stroke is heat sensitivity. In other words, once you have had a heat stroke, you are more sensitive to high temperatures for the rest of your life. Varying degrees of brain and kidney damage can also occur.

Preventing Heat Stress Will

- **Protect health** — Heat illness is preventable and treatable before it is life threatening.
- **Improve safety** — Any heat stress can impair functioning.
- **Increase productivity** — People work slower and less efficiently when they are suffering from heat stress.

Everyone has an essential role to play in preventing heat stress. Each member of the team should use good judgment to prevent heat-related illness. A heat stress control program should protect all workers. These workers range from those who can work comfortably in heat to those in poor physical shape.

To Control Heat Stress

- When possible, schedule heavy tasks and work requiring protective gear for cooler morning or evening hours.
- In prolonged, extremely hot temperatures, nonessential tasks should be postponed.
- Drink one glass of water every 15 to 30 minutes, depending on the heat and humidity. This is the best way to replace lost body fluid.
- Read medication labels to know how they cause the body to react to the sun and heat.
- Avoid alcohol and drugs as they can increase the effects of heat.
- Build up tolerance for working in the heat. Heat tolerance is normally built up over a one- to two-week time period.
- Take breaks to cool down. A 10- to 15-minute break every two hours is effective.
- Adapt work and pace to the weather.
- Provide heat stress training to workers and supervisors.
- Manage work activities. Match them to employees’ physical condition.
- Use special protective gear, such as cooling garments, headbands, and cooling vests on early entry workers.
- Know heat stress first-aid techniques.
Heat Exhaustion First Aid

• Move the victim to a cool place.
• Keep the victim lying down with legs straight and elevated 8 to 12 inches.
• Cool the victim by applying cold packs or wet towels or cloths. Fan the victim.
• Give the victim cold water if he or she is fully conscious.
• If no improvement is noted within 30 minutes, seek medical attention.

Heat Stroke First Aid

• Move the victim to a cool place. Monitor temperature. Remove heavy clothing. Light clothing can be left in place.
• Cool the victim right away by any available means, such as placing ice packs at areas with abundant blood supply (neck, armpits, and groin). Wet towels or sheets are also effective. The cloths should be kept wet with cool water.
• To prevent hypothermia, continue cooling the victim until his/her temperature drops to 102º Fahrenheit.
• Keep the victim's head and shoulders slightly elevated.
• Seek medical attention right away. All heat stroke victims need hospitalization.
• Care for seizures if they occur.
• Do not use aspirin or acetaminophen.

Personal Protection Equipment and Heat Stress

Most Personal Protection Equipment (PPE) limits sweat evaporation but not sweat production. Chemical-resistant suits can cause rapid thirst if sweat is not replaced. To slow the buildup of heat when wearing PPE, use special cooling wear.

• If the temperature is above 70º Fahrenheit — Cooling vests may be useful when pesticide handlers are wearing chemical-resistant suits. They are either doing heavy or moderate work for a prolonged period.
• If the temperature is above 80º Fahrenheit — Working in chemical-resistant suits for more than a half hour without taking frequent water and rest breaks is unsafe. Cooling garments and frequent breaks are recommended.

Breathing resistance is minimized, and the air stream has a cooling effect. Thus, powered air-purifying respirators and supplied-air respirators generally feel cooler than other types of respirators.

Review These Important Points

• Heat stress is serious. Heat stress should be handled as such.
• As strain from heat increases, body temperature and heart rate can rise rapidly.
• Exposure to heat can be serious to workers of all ages.
• Have plenty of liquids available. Administer first aid as needed.
About These Modules

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Heat Stress

True or False?

1. The illness caused by heat stress is very real. T F
2. Heat stress may result from the buildup of muscle-generated heat in the body. T F
3. Exposure to heat stress is not a problem with younger workers. T F
4. The most serious heat-related illness is heat stroke. T F
5. More than 20 percent of those who suffer a heat stroke die. T F
Hypothermia, Frostbite, and Trench Foot
for Trainers and Supervisors

Objective: Identify the symptoms and treatment of hypothermia, frostbite, and trench foot.

Trainer’s Note

Workers are often exposed to cold, windy, wet conditions that can lead to serious injuries. For this module:

• If possible, provide copies of the Cold Stress Card from the OSHA web site, a quick reference about general hypothermia, frostbite, and trench foot.
• Review the information below on hypothermia, frostbite, and trench foot.
• Ask workers to describe cold-related stresses.
• Review the important points.
• Have workers take the True/False test to check their learning.

Background

Workers need to be aware of cold weather and its effects on the body, including symptoms and treatment. The harmful effects of hypothermia, frostbite, and trench foot may arise for any worker exposed to high winds and cold temperatures. More than 700 people die of hypothermia every year in the United States.

<table>
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<tr>
<th>Hypothermia</th>
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<td><strong>Causes</strong></td>
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<tr>
<td>• Freezing temperatures.</td>
</tr>
<tr>
<td>• Any climate that makes body temperatures fall below 98.6°F.</td>
</tr>
<tr>
<td>• Being in a cold building.</td>
</tr>
<tr>
<td>• Older workers are especially at risk.</td>
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<tr>
<td><strong>Symptoms (by body temperature)</strong></td>
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<tr>
<td>• Around 95°F (35°C): shivering, lethargy, and mild confusion.</td>
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<tr>
<td>• From 90°F (32°C) to 95°F (35°C): dazed consciousness, slurred speech, and irrational behavior.</td>
</tr>
<tr>
<td>• Below 90°F (32°C): hibernation, slowing the heart rate, blood flow, and breathing; possible unconsciousness and full heart failure.</td>
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Continued
### Hypothermia (continued)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>On Land</th>
<th>In the Water</th>
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<tbody>
<tr>
<td>• Call 911 or ambulance.</td>
<td>• Call 911 or ambulance.</td>
<td></td>
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<tr>
<td>• Move to a warm, dry area.</td>
<td>• Get out of the water fast. Do not try to swim without a floating device or any help because swimming requires body heat, which reduces survival time by 50 percent.</td>
<td></td>
</tr>
<tr>
<td>• Remove any wet clothing and replace with warm, dry clothing or blankets.</td>
<td>• Do not remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods to slow the loss of heat by trapping water closest to the body.</td>
<td></td>
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<tr>
<td>• Drink warm, sweet drinks such as sugar water or sports-type drinks. Avoid drinks with alcohol or caffeine like coffee, tea, or hot chocolate.</td>
<td>• If you cannot get out of the water, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles, or huddle with others with chests close together.</td>
<td></td>
</tr>
<tr>
<td>• Move arms and legs to generate muscle heat or place warm bottles or hot packs in the armpits, groin, neck, and head areas.</td>
<td>• Do not massage the body or get in warm water because it may stop the heart.</td>
<td></td>
</tr>
<tr>
<td>• Do not massage the body or get in warm water because it may stop the heart.</td>
<td>• Do not</td>
<td></td>
</tr>
</tbody>
</table>

### Frostbite

<table>
<thead>
<tr>
<th>Causes</th>
<th>When the temperature or wind chill falls below freezing, skin tissue can actually freeze.</th>
</tr>
</thead>
</table>
| Symptoms | • Uncomfortable sensations of coldness.  
• Tingling, stinging, or aching feeling.  
• Exposed body parts such as ears, fingers, toes, cheeks, and nose become pale, waxy-white, hard, and numb. |
| Treatment | • Cover the frostbitten parts with dry, sterile gauze or soft, clean cloth bandages.  
• Do not massage the frostbitten tissue because it could cause more serious injury.  
• Smoothly place the frostbitten parts in warm water (105°F).  
• Do not pour warm water directly on the affected parts because of potential tissue damage.  
• After warming the frostbitten parts between 25 and 40 minutes, keep them dry and wrapped.  
• Seek medical assistance fast. |
| Note | • If there is a possibility that the frostbitten parts may get cold again, do not warm them to avoid greater damage. |
Trench Foot

| Causes                  | • Long, continuous exposure to a wet, cold environment.  
|                        | • Actual immersion in water.  
| Symptoms               | • A tingling/itching sensation, burning, pain, and swelling.  
|                        | • Blisters in serious cases.  
| Treatment              | • Move to a warm, dry area.  
|                        | • Treat the affected tissue with careful washing and drying, rewarming, and slight elevation.  
|                        | • Seek medical assistance fast.  

Review These Important Points

- Do not massage the frostbitten tissue because it could cause more serious injury.
- If there is a possibility that the frostbitten parts may get cold again, do not warm them to avoid greater damage.
- In case of hypothermia on land, replace any wet clothing with warm, dry clothing. However, do not remove any clothing in the water.

About These Modules

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Hypothermia, Frostbite, and Trench Foot

True or False?

1. If body temperatures fall below 90°F (32°C), it can cause mild confusion.  
   T  F

2. Massage frostbitten tissue to cause muscle heat.  
   T  F

3. Drinking coffee is not good to treat hypothermia.  
   T  F

4. Being in a cold building can cause general hypothermia to the elderly.  
   T  F

5. Pour warm water directly on the frostbitten parts.  
   T  F
Laundering Pesticide-Contaminated Clothing for Trainers and Supervisors

Objective: Launder pesticide-contaminated clothing according to safety guidelines.

**Trainer’s Note**

Clothing exposed to pesticides must be washed separately and properly. For this module:

- Review the information below on why and how to launder clothing exposed to pesticides.
- Have workers discuss what to launder and what not.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Workers should always wear Personal Protection Equipment (PPE) when working with pesticides. However, even with PPE, regular work clothing absorbs pesticides. Your skin can then absorb the pesticides. Clothing can be decontaminated by washing. Pesticide-Contaminated Clothing (PCC) must be washed separately and properly. This also applies to reusable PPE.

Your employer should provide you with clean PPE. You should not take contaminated PPE home for cleaning — it will contaminate your home.

**Before Laundering PCC**

Read the pesticide label first. It may give directions for the laundering process. All clothing worn while working with pesticides should be considered contaminated. The clothing should be separated from other clothing. Wear rubber gloves when working with PCC. PCC should be washed after each use. It is easier to remove pesticides daily than to remove accumulated contamination. PCC should not be dry cleaned. PCC should not be washed in a public laundromat.

Before laundering PCC, check with local or state agencies for proper disposal of contaminated rinse water.

After taking off clothing, use soap and water to wash your hands, face, neck, and forearms. Then take a shower.
Laundering PCC

- Pre-rinse or pre-soak clothing. Pre-soak PCC with similar pesticides together.
- PCC should be washed separately from household laundry.
- The washer should not be overloaded. Wash a few items at a time.
- Use only hot water (140 to 160 degrees).
- The water level should be on the highest setting. Run a full cycle (12 minutes) using a double rinse.
- Dry soap should be used to clean dry forms of pesticides. Liquid detergent should be used to clean liquid forms of pesticides.
- Use 25 percent more soap when clothing has been treated with a soil- or water-repellent finish (i.e., Scotchguard™ or Zepe™).
- Bleach should not be used. It does not remove pesticide residue. It can react with ammonia fertilizer to form chlorine gas. This can be fatal.
- All laundered clothing should be line dried. Sunlight will help break down any pesticide residue left in the clothing. Also, line drying will keep the dryer from becoming contaminated.
- Store PPE clothing in a clean, dry place. Store away from other clothing. Store away from pesticides. Store away from pesticide containers.
- Clean the washing machine by running the empty washer through a full wash cycle with hot water and soap. This is an important step. If the washer is not decontaminated, other clothing will become contaminated.

Pesticides Cannot Be Removed From

- Leather boots
- Leather watchbands
- Inner bands on caps and some decorative items
- Severely contaminated clothing

Warning

- Do not wash limited-use coveralls if they have been contaminated with pesticides.
- Treat contaminated coveralls the same way you would treat the pesticide. Wear gloves and other PPE to protect yourself from pesticide residues within the clothing.

Reusable Coated/Laminated Suits

Suits made from materials such as polyvinyl chloride (PVC) or nitrile should not be decontaminated in a washer. Instead, hose them off. Then wash them in a tub of hot soapy water. Protective clothing made of nitrile, PVC, or other rubber-like compounds should be line dried. However, line dry them in the shade. Sunlight is harmful and will damage the suits. Suits made from plastic, nitrile, or latex may melt if placed in a dryer.

Review These Important Points

- Pesticide-contaminated clothing should be washed separately from other clothing.
- Use the maximum water level and the hottest water. Line dry the clothing.
- Clean the washer with a full wash cycle using hot water.
- Contaminated coveralls should be treated the same way you would treat the pesticide.
About These Modules

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Laundering Pesticide-Contaminated Clothing

Name____________________________________

True or False?

1. Pesticide residue can easily be removed from leather. T F

2. Contaminated clothing should be laundered after each use. T F

3. Rubber gloves should always be worn when laundering pesticide-contaminated clothing. T F

4. Pesticide-contaminated clothing does not have to be kept separate from other laundry. T F

5. Bleach should not be used in the laundering process. T F
Loading Docks and Warehouses for Trainers and Supervisors

Objective: Work safely on the loading dock and in warehouses.

Trainer's Note

Sometimes, loading docks and warehouses are accidents waiting to happen. For this module:

- Review the information below on hazards and safety tips.
- Walk through your own loading dock and warehouse with workers.
- Ask workers to identify potential hazards they see and ways to avoid them.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Loading docks and warehouses are full of forklifts and other material-handling devices, powered or unpow-dered. Two common serious accidents involving powered industrial trucks are:

- Backing off the dock.
- Overturns (turning too fast with the wheels too close to the edge of the dock).

Improper and irregular stacking of materials causes accidents. Failure to tie in stacked boxes or cartons and piling stock too high cause the stock to fall. Make sure that stacked materials do not block the building sprinkler system.

Before Unloading a Truck

- Double check to be sure that the truck brakes are set.
- Chock the rear wheels of the truck. Chocking the rear wheels keeps the trailer from moving away from the dock when you enter the truck. For more information, see the Tailgate Safety Training module Chock and Block.

Loading Dock Tips

- Be alert when working on the dock.
- Don’t speed; watch out for other trucks and workers.
• Look for boxes, cartons, drums, crates, or skids that are not in their proper places. Also watch for items that extend beyond the aisles.

• Follow established traffic lines and storage boundary lines.

• Be aware of which materials should not be stored close together — for example, chemicals whose vapors could be harmful if combined.

• Be especially alert for overhead hazards, like pipes, structural members, lights, door casings, high cable wires, and signs.

• Know where fire extinguishers are located and what type of extinguisher to use on different types of fires. For more information, refer to the Tailgate Safety Training module Portable Fire Extinguishers.

• Follow rules regarding the handling and storage of flammable materials.

• Pay attention to the U.S. Department of Transportation official warning signs, symbols, and labels on containers.

• In case of a spill:
  ◆ Identify the spilled material.
  ◆ Evacuate the area or don Personal Protection Equipment if necessary.
  ◆ Notify other workers and your supervisor of the spill.
  ◆ Contain the spill with appropriate materials or devices.
  ◆ Stop the source of the spill.
  ◆ Clean up the spill.

Review These Important Points

• Be alert on the dock.

• Stack materials properly.

• Follow all established traffic lanes and storage boundary lines.

• Know where all fire extinguishers and fire alarm boxes are located.

• Be aware of overhead hazards, like pipes, structural members, lights, door casings, or high cable wires and signs.

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Loading Docks and Warehouses

Name____________________________________

True or False?

1. Injuries are caused by the improper and irregular stacking of materials on the dock and at the warehouse. T F

2. Follow established traffic lanes and storage boundary lines. T F

3. It is not important to chock the wheels of trailers at docks for loading or unloading. T F

4. It is important for all employees to know where to locate a fire extinguisher. T F

5. It is not important to keep the work area clutter free. T F
Lockout and Tagout for Trainers and Supervisors

Objective: Lockout and tagout equipment properly.

**Trainer's Note**

Lockout and tagout are important to prevent injuries from powered machinery. For this module:

- Explain the information below carefully to workers.
  - What lockout and tagout are.
  - The purpose of lockout and tagout.
- If employees are not familiar with the terms, it may be necessary to define them.
- Demonstrate locking out and tagging out on a piece of equipment.
- Discuss how lockout and tagout apply to different jobs and applications.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

To **lockout** means to place a lock on a device. The lock prevents electrical power from going to a piece of equipment and keeps the equipment from operating. Also, the lock may prevent energy from being released; for example, a hydraulic system is locked out in a specific position to prevent it from moving. The goal is to prevent unexpected starting or energizing of equipment during service or repair. A switch or lever is locked in the OFF or LOCKED position to prevent movement of equipment while maintenance is done.

To **tagout** means to place a warning tag on a switch or other shut-off device to **warn** others not to start the piece of equipment. Tagout should only be used with lockout, unless locking out the equipment is impossible.

Equipment should be locked out while being repaired. In addition to lockout, any stored energy in the equipment should be blocked from release. For example, hydraulic equipment in a raised position could be lowered by accident during the repair. Either lower the equipment first or support the equipment in the raised position. Electrical energy may be stored in a battery or capacitor. Amputations, fractures, or even death could occur while cleaning or repairing equipment. For example, locking out the power to grinding equipment, sharpening machines, soil mixing or filling equipment, growth chambers, limb or brush shredders, stump grinders, and other equipment is critical to avoid serious injury.
Lockout and Tagout Procedures

- Notify all affected employees that a lockout/tagout procedure is ready to begin.
- Turn off power to the equipment at the control panel.
- Turn off or pull the main disconnect. Be sure all stored energy is released or restrained.
- Check all locks and tags for defects.
- Attach your safety lock or tag on the energy-isolating device.
- Try to restart the equipment at the control panel to ensure that it is secured.
- Check the machine for possible residual pressures, particularly for hydraulic systems and reciprocating and conveying equipment.
- Complete the repair or servicing work.
- Replace all guards on the machinery.
- Remove the safety lock and adapter.
- Restart the equipment to ensure proper and safe operation.
- Let others know that the equipment is back in service.

Common Mistakes in Lockouts

- Leaving keys in the locks.
- Locking the control circuit and not the main disconnect or switch.
- Not testing the controls to make sure they are definitely inoperative.

Review These Important Points

- Equipment should be locked out while being repaired.
- Lockout means to place a lock on a device that prevents energy release.
- Tagout means to place a tag on a switch or other shut-off device that warns not to start that piece of equipment.
- Make sure to remove keys from the locks.
- Lock the main switch.
- Test the controls to make sure they are definitely inoperative.
- Replace all guards on the machinery after servicing.
- Restart the equipment to ensure safe and proper operation.

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Lockout and Tagout

Name____________________________________

True or False?

1. To lockout means to place a lock on a device that will prevent the equipment from starting or moving. T F

2. To tagout means to place a tag on a switch or other shut-off device warning others not to start that piece of equipment. T F

3. Equipment doesn’t need to be locked out while being repaired. T F

4. Never leave the key in the lock when locking out. T F

5. Always test the controls in a lockout to make sure they are definitely inoperable. T F
Material Handling Devices for Trainers and Supervisors

Objective: Use tools and equipment effectively and safely to move landscaping and horticulture materials.

**Trainer’s Note**

Using mechanical devices makes handling material easier. But it may increase the risk of an accident. For this module:

- Review the information below on devices and safety tips.
- Ask experienced workers to demonstrate the proper use of each device.
- Observe workers while they practice using devices.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Mechanical devices can be a great help in moving materials, from equipment to containerized plants and bags of mulch. A variety of devices can reduce physical exertion and simplify the job. But those devices also present risks and must be used safely.

For information on other material handling equipment, refer to the Tailgate Safety Training modules *Forklift Safety, Tractor Loader Safety, Rollovers and Rollover Protective Structures (ROPS)*, and *Safe Use of Hand Pallet Trucks or Electric Carts*.

**Hand Trucks**

- Wheelbarrows, dolly trucks, and two-wheeled utility trucks are all referred to as hand trucks.
- Two-wheeled hand trucks can lift and transport heavy, bulky objects short distances.
- Work gloves and safety shoes should be worn. Steel-toe shoes are best.
- Hand trucks should be equipped with canvas, leather, or rubber knuckle guards to help prevent hand injuries.
- Check for defects before loading — loose parts, torn wheels, greasy surfaces. Reports defects you find.
- Use proper lifting techniques when lifting a load. For more information, see the Tailgate Safety Training module *Preventing Lifting and Over-Exertion Injuries*.
- When loading, the heavy objects should be below the lighter ones, and the load should be kept as low as possible.
- The load should be balanced over the axles.
• Make sure the load does not hang over the edges.
• The hand truck should not be overloaded, and the load should not obstruct your view.
• The operator should push and balance the truck and should always walk forward.
• If the truck has brakes, use them. Don’t hold the truck in place with your foot.

Conveyors

• Generally, conveyors used in industry are roller, belt, screw, bucket, chain, overhead trolley, portable, mobile, tow, or assembly types.
• Moving parts should be guarded with metal or wire mesh enclosures or railings.
• Rollers or pulleys at the ends of belt conveyors should be guarded to prevent fingers and hands from being drawn into pinch points.
• A shield, guard, or housing should enclose each end and all other areas at floor level where workers could come in contact with moving parts.
• Avoid riding on conveyors, except those that incorporate platforms and control rooms for operating personnel.
• Conveyors should have conveniently located warning devices and emergency stop controls.
• Turn off power and lock the switch during maintenance.
Cranes and Derricks

- Only trained operators are permitted to run cranes.
- The rated load must be plainly marked on each side of the crane, and the crane must never be overloaded.
- Never work or stand underneath a crane that is moving material.
- If operating, do not swing loads over workers.
- Keep hoisting chains and ropes free from kinks.
- Use a load block hook with a sling — do not wrap ropes around loads. Operators should make sure the sling clears all obstacles.
- Both the operator and the signaler should understand and use standard hand signals for boom cranes. For more information, refer to the Tailgate Training module *Hand Signals for Vehicle Safety*.
- Crane operators should never remove their hands and feet from the controls while a load is suspended.

**Review These Important Points**

- All employees should be trained before operating machinery.
- Watch for co-workers when completing work tasks.
- Make sure all loads are balanced when moving.
- Keep all screens and safety shields in place.
- Use standard hand signals for communication.

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Material Handling Devices

Name____________________________________

True or False?

1. Use standard hand signals for communication.   T  F
2. Two-wheeled hand trucks are used for transporting heavy and bulky objects short distances.  T  F
3. Brakes aren’t necessary on two-wheeled hand trucks; the operator can hold the truck in place with one foot.  T  F
4. Crane operators should never remove their hands and feet from the controls while a load is suspended.  T  F
5. Pay attention to maximum load limits and never overload.   T  F
Mixing and Spraying Pesticides for Trainers and Supervisors

Objective: To identify the proper way to mix and spray pesticides.

**Trainer’s Note**

Pesticides contain hazardous chemicals; they must be mixed and sprayed safely. For this module:

- Review the contents of this module with your workers.
- Discuss any questions they have after reviewing the module.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

For related topics, see the Tailgate Safety Training modules *Laundering Pesticide-Contaminated Clothing, Pesticide Exposure, Personal Protection Equipment (PPE) for Pesticides,* and *Reading Pesticide Labels.*

**Background**

All workers who mix and spray pesticides must be properly trained to ensure their safety. This training must be conducted within the first five days of employment. The U.S. Environmental Protection Agency (EPA) offers Worker Protection Standard (WPS) training. (Details are available at: www.epa.gov/oppfead1/safety/workers/training.htm.) Training is usually conducted by state agencies. (Details are available at: www.epa.gov/oppfod01/safety/applicators/statepro.htm.)

Employers who have received WPS training can provide this training or hire someone who has been WPS trained. During the training session, you should always ask questions if you do not understand a point of instruction.

WPS training contains requirements for:

- Pesticide safety training
- Notification of pesticide applications
- Use of Personal Protection Equipment (PPE)
  - Gloves
  - Footwear
Proper Mixing of Pesticides

- Before mixing, test the sprayer with water to see if it leaks and is working properly.
- Read the label to determine the proper mixture.
- Wear PPE while mixing pesticides.
- Mix in a grassy area. Do not mix on concrete or hard surfaces.
- Only use water unless directed by the label to use another liquid.
- Fill the sprayer with two-thirds of the water needed. Then add the proper amount of pesticide. Then add the remaining one-third of water.
- Mix only the amount necessary to do the job.

Proper Spraying of Pesticides

- Spray so that other workers or persons are not exposed. For more details, refer to the Tailgate Safety Training module *Pesticide Exposure*.
- Other workers and persons must not enter the area where a pesticide is being sprayed.
- Be aware of wind direction. Wind can cause the pesticide to drift to areas not chosen for spraying.
- If possible, spray early in the morning or in late afternoon. High humidity will lessen the chance of drifting.
- Wear PPE while spraying. Also, PPE must be worn during the restricted, early-entry period. For more details, see the Tailgate Safety Training module *Personal Protection Equipment (PPE) for Pesticides*.
- All workers must be notified in advance of where spraying is to occur.
- All workers must have immediate access to water, soap, and towels for routine washing and emergency decontamination.
- Anyone exposed to a pesticide must be taken to a medical facility. Tell medical personnel the type of pesticide being used.
- All workers must be informed of pesticide label requirements. Central posting of recent applications is required. For more details, see the Tailgate Safety Training module *Reading Pesticide Labels*.

Clean Up and Proper Disposal of Pesticide Containers

- Rinse all equipment with water in a grassy area. Never clean up on a hard surface.
- Never flush pesticide residue into a storm drain or any type of drain.
- Always wash with soap and water before you eat, drink, smoke, or go the bathroom.
- Clothing worn during spraying should be washed separately. For more details, see the Tailgate Safety Training module *Laundering Pesticide-Contaminated Clothing*.
- Before discarding an empty container, fill it half full of water. Shake it to rinse. Empty the rinse water into the sprayer. Spray in a grassy area. Do this three times. This process will also clean the sprayer bottle and hose.
- Once the container has been completely rinsed, punch a hole in the bottom. Wrap the container in newspaper and place in the trash.
- Do not burn empty containers.
- Do not recycle containers.
Review These Important Points

- All workers must be properly trained in the mixing and spraying process.
- The EPA offers WPS training.
- Read the label to determine the proper mixture.
- PPE must be worn while mixing and spraying.
- Rinse all equipment with water in a grassy area. Never clean up on a hard surface.

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Mixing and Spraying Pesticides

Name____________________________________

True or False?

1. Training is not necessary before mixing and applying pesticides.  T  F

2. Always read the pesticide container label for proper mixing and spraying directions.  T  F

3. Mix pesticides in grassy areas, not on concrete or hard surfaces.  T  F

4. It is not necessary to tell other workers where you will be spraying.  T  F

5. After spraying pesticides, you do not need to wash up before eating or drinking.  T  F
Mosquito Bites for Trainers and Supervisors

Objective: Prevent and treat the harmful effects of mosquitoes.

**Trainer's Note**

Mosquito bites can be at least itchy and annoying. Sometimes, however, they can transmit dangerous diseases. For this module:

- Review the information below on mosquitoes, West Nile Virus, and preventing mosquito bites.
- Ask workers to give examples of the harmful effects of mosquitoes.
- Review the important points.
- Have workers take the True/False test to check their learning.

**Background**

Mosquitoes prey on blood for nutrition. They feed on many different donors every day. They can contract diseases like malaria or West Nile Virus from any one of those donors. When they bite humans, they can pass those diseases to humans in their saliva.
Mosquito bites result in slight allergic reactions — they swell and itch. Too much scratching can lead to bleeding and scabbing. It can cause secondary infection. Take these steps to help control swelling and itching:

- Wash the area with soap and water.
- Put on some calamine lotion or anti-itch cream to help stop the itching.
- Place an ice pack on the bite; this will also help stop itching.

**West Nile Virus**

Mosquitoes can transmit serious diseases such as mosquito-borne encephalitis, malaria, and West Nile Virus. The West Nile Virus originated in Africa. It has now established itself in the United States.

Mosquitoes become infected when they feed on infected animals, especially birds. The mosquitoes can then transmit the virus to humans when they bite humans. During the bite, the virus is injected into the human where it multiplies and may cause disease.

Workers should be on the lookout for symptoms of West Nile Virus in particular. Mild symptoms include:

- Fever
- Headache
- Body aches
- Skin rash
- Swollen lymph glands

**Severe symptoms** of West Nile Virus include:

- Neck stiffness
- Disorientation
- Stupor
- Coma
- Tremors
- Convulsions
- Muscle weakness
- Convulsions and paralysis

If workers have either mild or severe symptoms, they should seek medical assistance quickly.

**Preventing Mosquito Bites**

- Stay indoors at dawn and dusk and in the early evening, if possible.
- Wear long pants and long sleeves outdoors.
- Use space sprays or aerosol foggers for rapid knockdown of mosquitoes.
- Apply residual sprays to tall grasses, weeds, trees, shrubs, and outbuildings one to two days before use of the area.

**Cautions**

- Use water solutions instead of oil-based formulations to prevent plant injury.
- Dead birds such as crows can be tested for West Nile Virus if they have been dead less than 48 hours. To handle dead birds, always use rubber gloves or a shovel.
Review These Important Points

• Mosquitoes can acquire a disease every time they bite an animal or a human.
• Mosquitoes can also transmit a disease every time they bite.
• Residual sprays applied to tall grasses, weeds, trees, shrubs, and outbuildings, one to two days before use of the area, are effective in preventing mosquito bites.

About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Mosquito Bites

True or False?

1. Mosquito bites can result in allergic reactions with discomfort and itching.  T  F

2. Mosquitoes become infected when they feed on infected birds.  T  F

3. Dead birds such as crows can be tested for West Nile Virus if they have been dead more than 48 hours.  T  F

4. Wearing long pants and sleeves outdoors help workers prevent the West Nile Virus.  T  F

5. Mosquitoes can transmit serious diseases such as malaria or West Nile Virus.  T  F
Objective: Identify the information provided on the Material Safety Data Sheet.

Trainer’s Note

Safety conditions increase when on-the-job hazards are known. The Material Safety Data Sheet (MSDS) is a good reference for information on hazardous substances. For this module:

• Review the typical information on an MSDS.
• Review a sample MSDS for a hazardous substance used by your own workers.
• Use the sample MSDS to guide a discussion on the hazards identified in the MSDS.
• Explain the training on hazardous chemicals you provide.
• Review the important points.
• Have workers take the True/False quiz to check their learning.

Background

The Material Safety Data Sheet (MSDS) provides information on hazardous materials and wastes. Chemical makers must provide an MSDS for each product. Distributors must get the MSDS to employers. It must be available to workers exposed to hazardous substances. An MSDS is required at greenhouses and nurseries with more than 11 full- or part-time workers. Keep at least one copy of the MSDS with the chemical.

What Is in an MSDS?

MSDSs provide vital information to different people on the job:

• Workers who use, handle, and store hazardous substances.
• Employers who must provide safe storage and appropriate Personal Protection Equipment (PPE).
• Emergency personnel who respond in case of a spill, accident, or physical injury. These can include fire fighters, hazardous material crews, and medical personnel.

MSDSs are not all the same. They can be organized in a number of different ways. Some MSDSs have only eight or nine sections; others may have 12 or 14. However, any MSDS should include these types of information:

• Product identification
  1. Formal chemical name and make-up
  2. Trade name on the label
3. Name and locations of the manufacturer and distributor
4. Emergency telephone number(s)

• Hazard identification
  1. Amount of hazardous ingredient that causes ill effects
  • Threshold Limit Value (TLV) — maximum average concentration recommended over an eight-hour workday.
  • Permissible Exposure Limit (PEL) — exposure limit set by the Occupational Safety and Health Administration (OSHA); enforced by law.
  • Lethal Dose Concentration (LD50) — dose that kills 50 percent of test animals in experiments.
  2. Overview of information for emergency personnel
  3. Ill effects of acute ocular, oral, dermal, or inhalation exposure
  4. Chronic effects of long-term exposure

• First-aid procedures
  1. What to do in case of acute exposure
  2. Instructions to medical personnel for emergency procedures

• Handling and storage procedures
  1. Hygiene
  2. Temperature control
  3. Ventilation

• Personal Protection Equipment (PPE)
  1. Personal eye protection to avoid ocular exposure
  2. Rubber gloves, rubber boots, long-sleeve shirt, long pants, and face shields to avoid dermal exposure
  3. Respiratory protection to avoid inhalation exposure

• Fire and explosion hazards and procedures
• Procedures for cleaning up spills and leaks
• Disposal information

How to Use an MSDS

• Find out where MSDSs are kept in your workplace. Find out how they are filed so you can find the one you want.
• Look over the format of each MSDS to see how information is presented.
• Find out how to make the MSDS available to emergency personnel, if necessary.
• Find out what PPE is required to handle the substance.
• Find out what procedures are needed for safe handling — hygiene, temperature control, ventilation.
• Look for information on ill effects of acute exposure. Find out what symptoms you should look for when you handle the substance.
• Find out what first aid procedures to use for acute exposure.
• Find out how to handle a spill or a leak.
• Find out how to store the substance safely when you finish the job.
• Ask your supervisor any questions you still have about how to handle the substance safely.

Employer Training

Employers must provide information and training to workers who might be exposed to hazardous chemicals. New workers must be trained before they first work with a hazardous chemical. And all workers must be trained when a new hazard is introduced to the workplace. All workers should find out what training their employer provides. They should also make sure they receive all the training they need.
Review These Important Points

- The MSDS provides critical details about the substance it describes.
- The MSDS lists hazardous ingredients and other health hazards.
- The MSDS identifies Personal Protection Equipment required for the substance.
- Workers must receive training on hazardous chemicals.

About These Modules

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Material Safety Data Sheet

Name____________________________________

True or False?

1. Workers must be trained about chemical hazards on the job. T F
2. The MSDS helps to protect employees. T F
3. There is no standard form for an MSDS. T F
4. An MSDS contains information on hazardous materials and wastes. T F
5. An MSDS describes chemical hazards and how to work with the chemical safely. T F
No Riders on Lawn Equipment for Trainers and Supervisors

Objective: Identify the dangers of riders on lawn equipment.

**Trainer's Note**

Riders on any power equipment are a safety hazard and should not be allowed. For this module:

- Ask workers to list reasons why people might have riders.
- Stress the hazards involved with riders.
- Ask workers to discuss how these hazards outweigh possible benefits.
- Explain that a rider is allowed on tractors and other equipment for training purposes only.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Most equipment does not have an extra seat, but some workers allow riders. **Any rider for any reason is a safety hazard.** An extra rider may block the driver’s view or movement. And a rider also may:

- Fall from the equipment.
- Be run over.
- Become entangled in equipment.
- Be killed.

Extra passengers are problematic because they:

- Interfere with the operator’s vision and ability to use controls.
- Distract the operator.
- Increase the rider's exposure to noise, dust, and chemicals.
- Increase the risk of a multiple injury incident.

Advance planning helps avoid the need for riders. You can plan other transportation if additional workers are needed at the work site.
Remember

- Only one person is allowed on each piece of machinery.
- No riders should be allowed on any lawn equipment. This should be strictly enforced. No children — ever!
- New workers should be trained in the classroom or the shop before they drive machinery and lawn equipment.
- Use additional vehicles to transport workers to and from a job site — not lawn equipment.

Review These Important Points

- Riders on any power equipment are a safety hazard and should not be allowed.
- All drivers of equipment need training in a classroom setting.
- Plan transportation for passengers early. This reduces the temptation to carry riders on machinery and lawn equipment.

About These Modules

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No Riders on Lawn Equipment

True or False?

1. Advance planning of all transportation needs is one way to keep riders off lawn equipment. T F

2. Extra riders can be a distraction to the operator. T F

3. Small children can ride on lawn equipment. T F

4. Most equipment provides extra seating for riders. T F

5. Two heads are better than one when it comes to making quick decisions on lawn equipment. T F
Non-Vented Heaters for Trainers and Supervisors

Objective: Use non-vented heaters safely.

*Trainer's Note*

Many greenhouses and other buildings use non-vented space heaters. For this module:

- Review the information below on safety features and safe practices for electric, kerosene, and natural gas heaters.
- Point out safety features and demonstrate safe practices to workers.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Many landscaping and horticulture businesses use non-vented space heaters in greenhouses and other buildings. Workers should be aware of:

- Where heaters are positioned.
- Safety issues such as carbon monoxide poisoning and proper ventilation.
- Safety features such as tip-over switches.

These heaters are usually free-standing and do not require ventilation ducts. However, adequate air circulation is necessary to ensure safe working conditions. Fans can be used to circulate air. Windows and doors can be opened slightly to increase circulation. If kerosene or gas heaters are used, be aware of the possibility of carbon monoxide poisoning. Gas heaters should be equipped with oxygen depletion sensors that will active when the air becomes oxygen poor.

**Safety Tips for Electric Heaters**

- Know where the heater is located in the work area.
- Make sure the heater is not positioned near aisles or walkways. Allow at least three feet of clearance from other objects.
• Be aware that electric heaters can become very hot to the touch.
• Keep all safety guards in place.
• Only use a heater that has an automatic shutoff switch if it is tipped over.
• Make sure that the insulation on the cord is not frayed or brittle.
• Follow all manufacturer guidelines listed on the heater and in the operator’s manual.
• Report any problems or malfunctions to your supervisor or employer.

Safety Tips for Kerosene Heaters

• Know where the heater is located in the work area.
• Make sure the heater is not positioned near aisles or walkways. Allow at least three feet of clearance from other objects.
• Be aware that kerosene heaters can become very hot to the touch.
• Only use a heater that has an automatic shutoff switch if it is tipped over.
• Keep all safety guards in place.
• Only refill the heater when it is cool.
• Only use 1-K kerosene. Never use any other type of fuel. Other fuels could cause a fire or an explosion.
• Never overfill the tank.
• Store kerosene in a sealed blue container clearly marked “kerosene.” Never put kerosene in a container that has held other fuels such as gasoline. Even a small amount of gasoline in a kerosene heater can cause a fire.
• Make sure the wick is set at the proper height. A short wick can cause carbon monoxide levels to rise.
• Make sure there is adequate ventilation when using kerosene heaters. A heater that operates poorly could emit carbon monoxide. Carbon monoxide poisoning has symptoms similar to the flu. Symptoms could include nausea, chest pain, drowsiness, vomiting, and confusion. Keep all interior doors open to help circulate air. Windows could be opened slightly to help air circulate.
• Kerosene heaters should not be used in airtight buildings.
• Follow all manufacturer’s guidelines listed on the heater and in the operator’s manual.
• Report any problems or malfunctions to your supervisor or employer.

Safety Tips for Natural Gas Heaters

• Know where the heater is located in the work area.
• Make sure the heater is not positioned near aisles or walkways. Allow at least three feet of clearance from other objects.
• Only use a heater that has an automatic shutoff switch if it is tipped over.
• Keep all safety guards in place.
• Only use a gas heater that has an oxygen depletion sensor. If there is a problem, this sensor will shut off the heater before carbon monoxide reaches dangerous levels.
• If the pilot light should go out, light a match before you turn the gas on. This will prevent the possibility of a flashback explosion.
• Never try to light the heater if you smell gas. If you smell gas, turn the heater off, open doors and windows, and leave the building. Report the problem to your supervisor or employer.
• Make sure there is adequate ventilation when using gas heaters. A gas heater that operates poorly could emit carbon monoxide. Carbon monoxide poisoning has symptoms similar to the flu. Symptoms could include nausea, chest pain, drowsiness, vomiting, and confusion. Keep all interior doors open to help circulate air inside the building. Windows could be opened slightly to help air circulate.
• Gas heaters should not be used in airtight buildings.
• Follow all manufacturer’s guidelines listed on the heater and in the operator’s manual.
• Report any problems or malfunctions to your supervisor or employer.
**Review These Important Points**

- Know where the heater is located.
- Make sure the heater is set at least three feet from other objects.
- Keep all safety guards in place.
- Follow all manufacturer guidelines when operating or filling the heater.
- Always allow for adequate ventilation while working.
- Be aware of the possibility of carbon monoxide poisoning.
- Report any problems to your supervisor.

**About These Modules**

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Non-Vented Heaters

Name____________________________________

True or False?

1. Do not use an electric heater if the cord is frayed. T F
2. Place the heater at least three feet from other objects. T F
3. Carbon monoxide poisoning symptoms are similar to flu symptoms. T F
4. If you smell gas, do not try to light a gas heater. T F
5. Remove safety guards if they get in your way while working. T F
Objective: Prevent contact with overhead power lines.

**Trainer's Note**

Overhead power lines are a constant danger in any outdoor work. For this module:

- Review the information below on the hazards of overhead electrical lines and how to avoid them.
- Give examples from your own firm or area of accidents involving overhead electrical lines. Ask workers to share examples they have.
- Invite a guest speaker from the local power company.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Long, tall, or large equipment can come in contact with overhead power lines:

- Ladders
- Long-handled trim saws
- Portable elevators
- Augers
- Irrigation pipes
- Dump trucks

When equipment contacts power lines, workers can be electrocuted and badly injured, even killed. Irrigation pipes and other machinery only need to be near an overhead power line to kill.

**Check the Location of Overhead Power Lines**

- Pulling or installing pump casing and pipe
- Raising or lowering machines
- Moving irrigation pipes
- Raising or moving ladders
- Pruning trees from the ground
- Working in trees
Remember These Cautions

- **Always look up for overhead hazards** like power lines, especially high-voltage lines.
- Always assume that overhead power lines don’t have protective insulation, so any contact is dangerous.
- Work as a team. One worker on the ground should be on the lookout for possible contact between equipment and power lines.
- Nonmetallic materials can conduct electricity. These are lumber, tree limbs, tires, and ropes.
- Electricity seeks one or more paths of least resistance. This includes going through people.
- Do not touch power lines.
- Untrained workers must stay at least 10 feet away from unguarded equipment.
- Never store anything under power lines — no equipment, no tools, no vehicles, no materials, nothing.
- Stay away from fallen overhead wires. Notify the power company right away.
- Ladders should not be used near overhead power lines.
- Plan a travel route for equipment that avoids overhead power lines.
- The ground level should not be raised under overhead power lines.

If You Are in a Vehicle That Comes into Contact With a Power Line

- Most important, **stay in the vehicle or in the boom or crane**. Do not try to get out unless the vehicle is on fire.
- If you can, disconnect from the power line. Back the vehicle or swing the boom or crane away from the power line.
- Get help from the power company — use your cell phone to call or yell to others nearby. Make sure no one else approaches the vehicle.
- Do not leave the vehicle until the power company tells you the line is de-energized. You can never know for sure if the line is going to come back on or not.
- **If the vehicle catches on fire, exit the vehicle very carefully:**
  - Jump out of the vehicle. Don’t worry about how far you jump, as long as you clear the vehicle.
  - Be sure to land on both feet and keep your balance when you land. This is more important than how far away you jump.
  - Don’t touch anything with your hands; use your hands for balance only.
  - Keep both feet on the ground at all times. Hop away from the vehicle — be sure to keep both feet together. Use your hands for balance only.
  - If you cannot hop, shuffle away — and keep both feet on the ground at all times. Do not lift one foot off the ground to step forward. Instead, drag one foot forward keeping it in touch with the ground.
  - Keep hopping or shuffling away until you get to where other people are standing safely.

Review These Important Points

- Assume overhead power lines have no protective insulation and contact may be fatal.
- Work as a team. One worker on the ground spots for the worker on raised equipment.
- Electricity always seeks one or more paths of least resistance.
- Never touch fallen overhead wires. Notify the power company right away.
- Workers should check for overhead power lines before doing any work.
- Plan your route of travel to avoid power lines.
About These Modules

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Overhead Electrical Hazards

Name____________________________________

True or False?

1. Never touch power lines. T F

2. Nonmetallic materials do not conduct electricity. These are lumber, tree limbs, tires, and ropes. T F

3. Irrigation pipes and other machinery do not need to touch an overhead power line for it to be lethal. T F

4. Notify the power company right away should a problem or concern arise. T F

5. Electricity seeks one or more paths of least resistance. T F
Personal Eye Protection for Trainers and Supervisors

Objective: Describe the proper selection, use, and care of eye protection.

Trainer’s Note

Most eye damage is permanent. Therefore, eye protection is vital in hazardous situations. For this module:

- Review the information below on eye and face protection and types of protective eyewear.
- Show workers examples of the different types of protective eyewear.
- Discuss how and when to use each piece.
- Let workers examine and try on the eyewear.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Shatterproof safety glasses, safety goggles, and face shields offer eye and face protection. And yet they provide for clear vision. Many eye protectors also have side shields and/or filter lenses. Side shields offer protection from flying objects. However, eye protection may not stop high-velocity flying objects. Filter lenses provide protection from radiation such as is encountered in welding. For more information, see the Tailgate Safety Training modules Gas Welding Safety and Arc Welding Safety.

As of July 5, 1994, all safety glasses must meet the minimum standards set forth by the American National Standards Institute (ANSI). Approved lenses are marked by the manufacturer. ANSI standard Z87.2 is for high impact protection. ANSI standard Z87.1 is for general eye and face protection, including chemical splash protection.

ANSI Z87.2 High Impact Lenses

ANSI Z87.1, Chemical Splash Lenses
Workers who wear prescription glasses should wear additional protective eyewear. Protective eyewear can either incorporate prescription lenses or fit comfortably over prescription glasses without disturbing the fit.

Select Protective Eyewear

- Wear goggles or a face shield around hazards:
  - Flying chips or particles
  - Electrical arcing or sparks
  - Chemical gases or vapors
  - Harmful light
  - Liquid chemicals, acids, or caustics (e.g., fertilizer solutions, acids used to lower water pH, pesticides, or growth regulators)
  - Molten metal
  - Dust
  - Swinging objects like ropes or chains.
- Goggles only provide eye protection. Face shields provide protection for the whole face.
- Be certain that protective eyewear is approved protection against the hazard for which it is being used. For example, workers need impact resistance for protection against flying objects. They need chemical splash resistance when working with liquid chemicals.
- If filter lenses are used, be certain that the filter lens is of a shade number appropriate for the type of work.
- Check with suppliers for the most appropriate types of eye protection for the hazard.

Inspect Protective Eyewear

- The arm pieces on safety glasses should touch the side of the head and curl behind the ears.
- Goggle lenses should be centered. The strap should rest low on the back of the head.
- Flexible elastic headbands must be in good shape.
- Discard pitted or scratched eyewear. Eyewear should be clean and defogged.
- Protective eyewear should fit snugly. It should be reasonably comfortable under conditions of use.

Keep Protective Eyewear Clean

- Clean the lenses thoroughly with soap and water.
- Disinfect eyewear that has been exposed to a hazardous substance or worn by someone else.
- Store clean eye wear in a closed, dustproof case. Plastic bags with a zipper work well.

To Protect the Eyes, Follow These Safety Tips

- Turn containers away from the face when opening.
- Remove protective eyewear only after turning off the tool.
- Replace outdated or scratched prescription lenses; they can distort vision.
- Replace cracked, pitted, or damaged goggles or spectacles.
- Concentrate on the task at hand when using power tools.
- Stop and relax the eyes if they are becoming strained.
- Keep sharp or pointed objects away from the face and eyes.

Review These Important Points

- Tools should be turned off before removing goggles.
- Inspect eyewear before wearing.
- Protective eyewear must comply with the minimum requirements of the American National Standards Institute.
- Store eyewear in a clean, dustproof case.
- Clean eye wear regularly.
About These Modules

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Personal Eye Protection

Name____________________________________

True or False?

1. The type of protective eyewear worn must be appropriate for the hazard. T F
2. Tools should be turned off before removing goggles. T F
3. Eye protection should be inspected once a year. T F
4. Workers who wear prescription glasses should wear additional protective eyewear. T F
5. It is acceptable to wear cracked, pitted, or damaged goggles when working in hazardous situations. T F
Pesticide Exposure for Trainers and Supervisors

Objective: Identify the types and causes of pesticide exposure and how to prevent them.

Trainer’s Note

Pesticides are common and useful but they can also be harmful, even toxic. For this module:

• Review the types of exposure and how each can happen.
• Discuss how Personal Protection Equipment (PPE) can protect workers from exposure.
• Review the important points.
• Have workers take the True/False quiz to check their learning.

For more information on pesticide safety, see all the Tailgate Safety Training modules on pesticides.

Background

There are four ways you can be exposed to pesticides:

• **Oral exposure** — swallowing pesticide
• **Dermal exposure** — getting pesticide on your skin, the most common type
• **Inhalation exposure** — breathing in pesticide
• **Ocular exposure** — getting pesticide in your eye

Causes for each type of exposure are explained here.

<table>
<thead>
<tr>
<th>Type of Exposure</th>
<th>Cause of Exposure</th>
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<tbody>
<tr>
<td>Oral exposure</td>
<td>• Not washing hands before eating, drinking, using tobacco.</td>
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<td>• Eating or drinking a pesticide by mistake.</td>
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<td>• Getting pesticide on food.</td>
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<td>• Splashing pesticide into the mouth.</td>
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<tr>
<td></td>
<td>• Blowing out plugged nozzles with the mouth.</td>
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<tr>
<td>Type of Exposure</td>
<td>Cause of Exposure</td>
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</tbody>
</table>
| Dermal exposure   | • Getting pesticides on bare skin.  
                   • Applying pesticides in windy weather.  
                   • Wearing inadequate PPE.                                                                                                                     |
| Inhalation exposure | • Prolonged contact in poorly ventilated areas.  
                     • Not using proper PPE.  
                     • Breathing vapors after application.  
                     • Using the wrong respirator.  
                     • Using an improperly fitted respirator.  
                     • Using tainted filters, cartridges, or canisters.                                                                                          |
| Ocular exposure   | • Getting pesticides in the eyes.  
                   • Not using proper eye cover when:  
                     • Spraying pesticide  
                     • Handling pesticide  
                     • Rubbing the eye with tainted gloves or hands.                                                                                             |

**Acute and Chronic Exposure**

Exposure is **acute** if you are exposed to a large amount of pesticide once. A spill on the body is one example. It’s usually easy to identify acute exposure.

Exposure is **chronic** if you have low-level exposure over and over. Chronic exposure may be hard to tell.

Either kind of exposure is dangerous. But a combination of acute and chronic exposure can be especially dangerous. For example:

- Wearing contaminated clothing can cause chronic exposure.
- A worker with chronic exposure might spill a pesticide on the skin.
- Now the worker has both chronic and acute exposure.
- The body may not be able to deal with the acute exposure on top of the chronic exposure. The worker is at great risk.

**To Avoid Exposure**

- Read pesticide labels. Look for the types of PPE needed and emergency procedures.
- Wear proper PPE.
- Wear proper eye cover.
- Use respirators whenever needed.
- If you breathe a pesticide, move away from the area quickly. Get to fresh air.
- Use a closed handling system. This keeps the applicator separate from the pesticide and avoids exposure.
- Maintain and clean PPE.
- Launder clothing after handling pesticides.
- Wash exposed body parts often to reduce dermal exposure.
- In case of exposure:
  - Use showers, eyewash fountains, hand/face spray units, and other emergency equipment.
  - Call 911 if appropriate.
  - Report exposure.

For more information on pesticide safety, see all the Tailgate Safety Training modules on pesticides.
Review These Important Points

- In dermal exposure, pesticide gets on the skin.
- In ocular exposure, the pesticide gets in the eye.
- In oral exposure, pesticide is swallowed.
- In inhalation exposure, pesticide is breathed in.
- You can be exposed to a pesticide if you use improper PPE.

About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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</table>
Pesticide Exposure

**Name____________________________________**

**True or False?**

1. Oral exposure can be caused by accidentally getting pesticide in the mouth. **T** **F**

2. Inhalation exposure can be caused by the wrong respirator or an improperly fitted respirator. **T** **F**

3. Ocular exposure can be caused by accidentally getting pesticide in the mouth. **T** **F**

4. Workers do not have to wash themselves after applying pesticide. **T** **F**

5. PPE can reduce exposure to pesticides. **T** **F**
Poison Ivy, Poison Oak, and Poison Sumac for Trainers and Supervisors

Objective: Avoid contact with poison ivy, poison oak, and poison sumac and treat reactions to these poisonous plants.

**Trainer’s Note**

Poison ivy, poison oak, and poison sumac can cause a nasty reaction. For this module:

- Review the information below on how to identify these plants, avoid them, and treat a reaction.
- Ask workers where they have found poisonous plants while working.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Many people are sensitive to poison ivy, poison oak, and poison sumac. A chemical called urushiol is present in the sap of these plants. If you touch or brush against a plant with broken stems or torn leaves, the sap can come into contact with your skin. The sap can cause a rash, blisters, and itching. Urushiol can stay on clothing, gloves, and tools for years if they are not washed.

**How to Avoid Contact with Poison Ivy, Poison Oak, and Poison Sumac**

- Recognize the leaf pattern of these poisonous plants and avoid them if possible.
- Try not to touch or brush against these plants.
• Dress appropriately. Wear gloves, a cap, a long-sleeve shirt, and long pants. Wear boots or shoes. Do not wear sandals or open-toed shoes.
• At the end of the workday, do not take a bath. Urushiol can stay in the tub water and can cling to your body when you get out of the tub. Instead, take a shower.
• Wash all your work clothes and gloves in hot water. Do not wash them with other clothes.
• Wash off tools with an outdoor water hose.
• Do not burn the plant. Burning can release the chemical in the smoke, and it can come into contact with your skin that way.

How to Treat a Poisonous Reaction

• If you know you have been exposed to urushiol, use rubbing alcohol on the exposed skin immediately. Once urushiol comes in contact with your skin, it penetrates very quickly. Also, do not return to the area where you were exposed until the next day. Rubbing alcohol removes the protective barrier on your skin and if you should contact urushiol again, it will penetrate your skin even faster.
• After using the rubbing alcohol, wash the exposed area with water.
• As soon as possible, shower with warm water and soap or a special wash like Zanfel™.
• All clothing should be washed separately in hot water. Shoes should be wiped with rubbing alcohol and water. Wear disposable gloves while cleaning your shoes.

If a Rash, Blisters, or Itching Develops

• A rash or blisters may develop if the skin is not cleaned quickly. This redness or swelling usually occurs within 12 to 48 hours after contact.
• Oozing blisters are not contagious because they do not contain urushiol. The fluid cannot spread the rash to other parts of the body. However, do not rub or scratch the blisters or rash. Infection could occur if your hands or fingernails are dirty.
• You will only have a rash or blisters where urushiol touched your body. The rash will not spread by itself. However, you might get a rash in a new area if you handle contaminated items again.
• The rash and blisters may appear at different times because the poison may absorb into your skin at different rates of penetration, depending on what part of the body was exposed.
• If you do nothing, the rash, blisters, and itch will go away in two to three weeks.
• If you want to treat the rash, blisters, and itch, try putting wet compresses on the area or soaking in cool water.
• To ease the itching, you can take oral antihistamines or hydrocortisones. These pills can be purchased at a local pharmacy.
• If you have a severe reaction, see a doctor. The doctor may prescribe an oral corticosteroid especially if the rash is on a sensitive part of the body. The drug must be taken for at least two to three weeks. If you stop too soon, the rash can reappear and be even worse.
• These over-the-counter products may also help dry oozing blisters: aluminum acetate, baking soda, Aveeno, aluminum hydroxide gel, calamine, kaolin, zinc acetate, zinc carbonate, and zinc oxide. Follow the directions on the label.

Review These Important Points

• While you are working, try not to touch poisonous plants.
• Usushiol can remain on your clothes for years if they are not washed properly.
• When working around poisonous plants, wear clothing that covers as much of your body as possible.
• Do not burn poisonous plants. Burning can release the poison into the air.
• Use rubbing alcohol immediately if you come into contact with a poisonous plant.
• Shower with warm water and soap as soon as possible.
• Wash your clothes separately in hot water. Clean your shoes with alcohol and water.
• If you develop a rash, blisters, and itching, apply warm compresses to the infected areas or bathe in cool water.
• Try using over-the-counter products to help ease the itch. Follow the directions on the label.
• If you have a severe reaction, see a doctor.

About These Modules

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</tbody>
</table>
Poison Ivy, Poison Oak, and Poison Sumac

Name____________________________________

True or False?

1. A warm bath is a good way to get urushiol off your skin.       T    F

2. The poison urushiol can stay on your clothes for years if clothes are not washed.       T    F

3. Burning poisonous plants destroys the urushiol.       T    F

4. Rubbing alcohol can be used to clean skin that has come into contact with a poisonous plant.       T    F

5. Once urushiol touches your body, it can spread to other parts.       T    F
Portable Fire Extinguishers for Trainers and Supervisors

Objective: Identify the types of fire extinguishers and use them properly.

**Trainer's Note**

All fires are not the same. Workers need to know which fire extinguisher to use for each type of fire. For this module:

- Review the information on the types of fire extinguishers and how to use and maintain them.
- Point out the placement of all units.
- Have units available for the training session. Discuss how to read the label, select the proper unit, and how to operate, inspect, and maintain it.
- Let employees practice using an extinguisher.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Fire extinguishers can put out or control a fire until help arrives. Use portable units as first-aid or emergency units on small fires or in the initial stages of the fire. The discharge time on most portable units is only seconds, so plan an escape route. Stay low and avoid breathing the smoke and extinguishing agent. If the fire starts to spread, get out!
Types of Fire Extinguishers

The universal classification system has different designations for fire extinguishers — class A, B, C, and ABC. Classes are based on the type of fire — that is, what is burning. The type of fire determines the type of extinguishing agent. A good example of a combination fire would be a fire in a greenhouse unit heater, where there is a combination of electricity and flammable heating oils. (A fourth class, Class D, is used for combustible metals, which are usually not found in landscaping and horticultural services.)

<table>
<thead>
<tr>
<th>Class</th>
<th>Symbol</th>
<th>Type of Fire</th>
</tr>
</thead>
</table>
| A     | Green triangle | Ordinary combustibles  
- Wood, paper, straw, cloth, rubber, plastics  
- Greenhouse glazing materials (acrylic, polycarbonate, fiberglass reinforced polyester) |
| B     | Red square | Flammable liquids  
- Gasoline, fertilizers, pesticides, oil, oil-based paint |
| C     | Blue circle | Energized electrical equipment  
- Wiring, fuse boxes, circuit breakers  
- Machinery, power tools, generators, unit heaters |
| ABC   |         | Multipurpose, combination unit can be used on all three types of fires |

Reading the Label

The label shows important facts about the fire extinguisher:

- The type of fire it can handle, shown by the letters A, B, and/or C.
- The size of fire it can handle, shown by numbers.

The bigger the numbers in the unit label, the bigger the fire the unit can handle. For example, a unit labeled 2A can handle a fire twice as big as a 1A unit. A 4A unit can handle a fire twice as big as a 2A unit.

A 2A:20B:C extinguisher will protect up to 3,000 square feet of area where a moderate fire may occur. This could be a storage, display, or shop area. It is also a good unit to carry on a tractor or a pickup truck.

Location and Placement of Fire Extinguishers

The table shows suggested location, number, and placement of fire extinguishers. The units suggested are 20-pound units.

<table>
<thead>
<tr>
<th>Location</th>
<th>Number</th>
<th>Suggested Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment storage building, chemical storage area, greenhouse, shop, boiler room, outbuildings/head-houses</td>
<td>1 or more</td>
<td>Near each exit door</td>
</tr>
<tr>
<td>Tractor, car, or truck</td>
<td>2</td>
<td>One near cab door</td>
</tr>
<tr>
<td>One at a convenient location</td>
<td>1</td>
<td></td>
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</table>
Before You Use the Fire Extinguisher

- Examine for defects at time of purchase.
- Read the operating instructions on the label.
- Find out where fire extinguishers are located.

To Operate a Fire Extinguisher

- Remove from the mounting bracket by grasping the unit by the carrying handle and the base and carry it to the fire.
- Pull the locking pin to break the tamper seal. If the unit has a hose, remove the hose from its retaining clip.

- Move the extinguisher as close to the base of the fire as possible. Grasp the hose in one hand and press or squeeze the handle or trigger release with the other. (If the unit is a CO₂ extinguisher, grasping the plastic discharge horn may freeze the hand.) If the unit has no hose, direct the stream of extinguishing agent by moving the extinguisher. If there is no pressure when you squeeze the handle, check the metal piece that is hanging downward and engage it into a groove, then try again to squeeze the handle.
- Use a side-to-side sweeping motion at the base of the flames starting from the near edge to the rear of the fire and then up the vertical surface.
- Always leave an escape route when fighting a fire.

Inspection of Fire Extinguishers

Inspect units monthly to ensure good working condition and adequate protection. Rotate the fire extinguisher to keep chemical from caking. Have units inspected annually by a state certified individual. Inspection should cover these points:

- Are all extinguishers in their recommended location?
- Is there enough pressure to discharge the contents of the extinguisher (check the gauge)? Replace or recharge the unit as needed.
- Is the tamper seal in tact?
- Is the unit damaged?
- Is the hose and nozzle unobstructed?
- Is the extinguisher area clear of clutter?
Review These Important Points

- Be prepared. Read the unit label before you need to use it for a fire.
- Inspect fire extinguishers monthly for proper functioning.
- Ensure that all designated locations have a fire extinguisher.
- In case of fire, evacuate the building first.
- Call the local fire department.

About These Modules

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Keith L. Smith, Associate Vice President for Agricultural Administration and Director, Ohio State University Extension
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Portable Fire Extinguishers

Name____________________________________

True or False?

1. Fire extinguishers can be used to fight a major fire. T F
2. To put out a fire, aim anywhere in the fire and spray. T F
3. Class A fire extinguishers can handle ordinary combustibles. T F
4. Any fire extinguisher will put out any fire. T F
5. Fire extinguishers should be inspected monthly. T F
Power Lawn Mowers for Trainers and Supervisors

Objective: Operate power lawn mowers according to safety guidelines.

**Trainer's Note**

Safe lawn mowing practices can prevent injuries. For this module:

- Review the information below on mowing hazards and safety practices.
- Point out the safety devices on mowers you use.
- Demonstrate Personal Protection Equipment (PPE) and lawn-mower maintenance.
- Discuss mowing accidents and brainstorm about how these accidents could have been prevented.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

A power lawn mower can be dangerous and cause serious injuries. A rotary mower blade whirls at 2,000 and 4,000 revolutions per minute. The tip of the blade travels at 100 to 200 miles per hour. For safety reasons, it is important to know how to quickly disengage the clutch and stop the engine.

**To Operate Any Power Lawn Mower, Follow These Tips**

- Begin by reading the operator’s manual.
- Before mowing, remove debris from lawn.
• Wear protective, close-fitting clothing.
• Use hearing protection if indicated by the operator’s manual. For more information, refer to the Tailgate Safety Training module Protecting Against Noise.
• Take mowers out of gear before starting.
• Keep all guards and safety shields in place.
• Never disengage any safety interlock switch.
• Never fill the gasoline tank on the mower if the engine is hot.
• Store gasoline in an approved, properly labeled container.
• Never store gasoline or any other hazardous material in a food container.
• Turn off the motor before removing a foreign object.
• Disconnect the spark or electric plug before repairing mower.
• Provide routine maintenance.
• Warn humans and pets to stay away from operating mowers.

Tip for Push Mowers

• Start push mowers from a firm stance with feet in a safe position.

Tip for Electric Mowers

• Never use an electric mower on wet grass.

Tips for Riding Mowers

• Keep both feet on the footrests of a riding mower.
• Turn off the motor before dismounting.
• No extra riders on self-propelled mowers. For more information, refer to the Tailgate Safety Training module No Riders on Lawn Equipment.
• Be aware of power-take-offs. For more information, see the Tailgate Safety Training module Safe Use of the Power-Take-Off (PTO).

Be Aware of Mowing Hazards

• A mower can tip over easily.
• Push the mower away from the body during a fall.
• Never leave a running mower unattended.
• Take rest periods as needed. For more information, refer to the Tailgate Safety Training module Heat Stress.
• Foreign objects can fly from the mower, so make sure the mowing area, including the throwing distance of the blade, is clear of people and animals.
Proper Mowing Directions

- When mowing on a slope with a riding mower, you should mow down the slope.
- When mowing on a slope with a push mower, you should mow across the slope.

Proper Dress for Mowing

- Sturdy shoes are a must; steel-toed work boots are advised.
- Long pants and long-sleeve shirts protect from flying debris, grass clippings, and sun.
- Safety glasses or goggles, especially when mowing near solid objects like gravel driveways.
- Hearing protection may be necessary.

Review These Important Points

- A rotary blade whirls between 2,000 and 4,000 revolutions per minute, with top speeds between 100 to 200 miles per hour.
- Wear protective, snug clothing when mowing.
- Keep guards and safety shields in place.
- Never disengage any safety interlock switch.
- Turn off the mower before removing any foreign objects.
- Know how to disengage the clutch and stop the engine.
- Never leave a running mower unattended.

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Power Lawn Mowers

True or False?

1. An improperly used power lawn mower can cause serious injuries. T F
2. The tip speed of a rotary mower blade is 100 to 200 miles per hour. T F
3. Do not turn off a lawn mower to remove foreign objects. T F
4. Carefully inspect the lawn for debris and remove it before mowing. T F
5. Keep lawn mower guards and shields in place at all times. T F
Personal Protective Equipment for Pesticides for Trainers and Supervisors

Objective: Choose the proper protection for pesticide application.

**Trainer’s Note**

Personal Protection Equipment (PPE) is critical in working with pesticides safely. For this module:

- Present the information below on different types of PPE.
- Use PPE and pesticide labels as visual aids for this session.
- Based on the recommendations provided on the labels, point out what equipment to wear during pesticide application.
- Have workers examine pesticide labels and determine what equipment is required.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Different Personal Protection Equipment (PPE) is available for use with pesticides. Pesticide labels give minimum requirements. The Environmental Protection Agency (EPA) provides resistance ratings for equipment. Remember that more is better!
Gloves

Wear unlined, elbow length, chemical-resistant gloves when handling any pesticide concentrate or chemical labeled DANGER, POISON, or WARNING. Not all gloves are suitable for all chemicals. Contact the glove manufacturer to determine if a specific glove is suitable for a particular chemical.

Check gloves for holes or leaks. To check for leaks, fill the gloves with water and squeeze. Throw the gloves away if water squirts through a hole. Leaks or holes in the gloves can expose the skin to chemicals. Either tuck gloves into shirt sleeves or vice versa. This prevents the chemicals from getting inside the gloves at the cuff. Before removing the gloves, wash them with detergent and water to prevent contaminating the hands.

Never wear cotton or leather gloves. They do not protect against skin exposure. Instead, they absorb the pesticide; workers are exposed again each time they wear the gloves.

Footwear

Wear unlined, lightweight, nonabsorbent boots that go up to mid calf. Wear long pants over boots to avoid getting pesticides inside the boots. After each use, thoroughly wash and dry boots inside and out to remove residue. Always wear gloves when cleaning contaminated footwear or any equipment.

Eye Protection

Wear tight fitting, non-fogging chemical splash goggles or a full face shield with splash protection. Straps should be nonabsorbent. Clean the eye protection and wash the sweatband after each use.

Head Protection

Wear a waterproof rain hat or washable, wide-brimmed hard or bump hat. Or, wear the hood of a disposable suit. Avoid cotton and felt hats — no ball caps. They absorb pesticides; workers are exposed again when they wear the hat again.

Clothing

Spraying contaminates clothing so be sure to wear fresh clothing daily. Remove contaminated clothing starting at the top and moving down. Roll clothing off, rolling contamination inward to prevent spreading.

Wash contaminated clothing separately from other laundry. Dispose of hooded disposable suits and items that are saturated with pesticides. Drop into plastic waste bag rolled in an open position.

Respirators

Wear a respirator when the pesticide label recommends it. It will be necessary to wear a respirator when handling concentrated, highly toxic pesticides. Be sure that the respirator fits properly and is the appropriate type for the hazard. Wear only respirators approved by the National Institute for Occupational Safety and Health (NIOSH) with the correct filter.

Review These Important Points

- Wear the right equipment for the job.
- Never use faulty or worn-out equipment.
- Always wash thoroughly when finished with pesticide applications.
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Personal Protective Equipment for Pesticides

Name____________________________________

True or False?

1. Eye protection should fit snugly and be non-fogging. T  F
2. Wear pants on the inside of the boots to avoid getting pesticides on the pants. T  F
3. Use a respirator as called for by the pesticide label. T  F
4. Never wear the same clothes without washing them first. T  F
5. It’s OK to wear ball caps when applying pesticides. T  F
Preventing Lifting and Overexertion Injuries for Trainers and Supervisors

Objective: Lift properly to minimize risk of injuries.

**Trainer’s Note**

Problems and injuries can arise from overexertion. For this module:

- Review the information on lifting, lifting hazards, and safe lifting.
- Describe jobs that might result in overexertion.
- Ask a worker to demonstrate appropriate lifting techniques.
- Cover some practical tips to avoid overexertion.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Approximately 25 percent of workplace injuries result from lifting, pulling, or pushing objects. The part of the body most often injured is the back.

**Material Handling — Think Before Lifting**

- Arrange your package delivery and material handling systems so that heavy loads are lifted and carried near the waist, between knee height and shoulder height.
- When possible, set heavy objects on pallets, benches, or other supports near waist height — not on the ground. It is impossible to achieve a good back position when lifting heavy objects from the ground.
- Have a handling plan that avoids slippery hazards and includes a destination.
- Test the load to be sure that it can be safely carried.
- Know the limits! If the load is too heavy, awkward, or bulky to carry alone, get help.
- Use machinery or equipment, such as a pushcart, hand truck, wheelbarrow, forklift, or hoist.
- Do not overlook the use of levers, inclined planes, or rollers to move loads.

Serious back injuries occur because of improper lifting techniques, like these:

- Bending from the waist to pick up objects.
- Lifting boxes above the chest.
• Twisting the body to carry or lift a heavy box or object.
• Lifting objects when in poor physical condition.

Guidelines for Safe Lifting

• **Use a proper lifting position.** Lift with your knees and legs — not with your back.
• **Get a good grip.** Grasp the load firmly. Use gloves if they allow for a better grip.
• **Get a good footing.** Center body weight to provide a powerful line of thrust and good balance.
• **Keep it close.** Grasp the load firmly and lift towards the belt buckle. Hold the load close to the body to avoid putting pressure on the back.
• **Lift smoothly.** Raise, carry, and lower the load smoothly. Never jerk a load.
• **Avoid twisting.** If turning is required while lifting or carrying a load, move the feet to turn the body instead of twisting at the waist.
• **Push.** Push rather than pull the load.

Review These Important Points

• Approximately 25 percent of work-related injuries result from overexertion, mainly from lifting.
• Think and plan before lifting.
• Push rather than pull the load.
• Use mechanical means whenever possible.
• Avoid twisting when lifting or setting down a load. Move the feet to turn the body instead of twisting at the waist.
About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Preventing Lifting and Overexertion Injuries

Name____________________________________

True or False?

1. For best results, always pull rather than push a load. T F

2. Wear gloves if they allow for a better grip. T F

3. Approximately 25 percent of all injuries result from overexertion, mainly from lifting, pulling, or pushing objects. T F

4. Use mechanical means to handle materials when possible. T F

5. To prevent injuries, you should move the feet to turn the body instead of twisting at the waist. T F
Preventing Falls from Trees for Trainers and Supervisors

Objective: To prevent falls while trimming or pruning tree limbs.

**Trainer’s Note**

Falls can occur while trimming or pruning trees if safety precautions are not taken. For this module:

- Review the information on safety concerns, equipment, and procedures.
- Ask workers to describe their own experience working in trees.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

For related information, see the Tailgate Safety Training modules *Proper Use of Ladders, Tree Pruning and Ladder Safety,* and *Overhead Electrical Hazards.*

**Background**

You should always use a full-body harness and other safety equipment while working in trees. A full-body harness wraps around the waist, shoulders, and legs. It has a D-ring in the center of the back to attach a lanyard or other safety devices. A full-body harness is the best type of safety system to use while you are trimming limbs. Always secure the harness before you start. Ask your employer if training and safety classes are provided for the proper use of harnesses and trimming equipment such as chain saws, hand cutting saws, and pruners. A safety belt can also be used while trimming limbs in trees. However, a safety belt will only keep you in position. It will not protect you if you should fall.

While trimming tree limbs, always be aware of electrical power lines. Most power lines are not insulated. Serious injury and possible electrocution can occur if you come into contact with power lines. Only experienced workers should trim trees near power lines. If possible, your employer should ask the power company to cut the power while you are trimming trees near power lines.

**Overhead Power Lines**

- Check for overhead power lines!
- Stay at least 10 feet away from power lines.
Safety Procedures to Prevent Falls

• Check trees and tree limbs for structural weakness before you climb or start trimming.
• Check all equipment for defects before you climb or start trimming.
• Be sure you are properly tied into the tree before you start trimming.
• Use a safety rope to raise and lower tools.
• Always pay attention to your footing. Check before you change your position.
• Always make sure that other workers are not below while you are trimming.
• If possible, have a co-worker on the ground act as a spotter.
• Do not work in trees if you are tired. Fatigue can lead to a fall or an accident.

Safety Equipment

• Full-body safety harness
• Safety belt
• Lanyards
• Lifelines
• Cross-arm strap
• Earplugs or noise mufflers
• Safety glasses or goggles
• Gloves
• Hard hat
• Steel-toed boots

Review These Important Points

• Always use the proper safety equipment while pruning trees to lessen the possibility of falling or having an accident.
• Only experienced workers should trim or prune tree limbs near power lines.
• Check all equipment for defects before you climb or start trimming.
• Never use a metal ladder to trim tree limbs near power lines.

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Answer Key: 1 = T, 2 = F, 3 = T, 4 = T, 5 = F.
Preventing Falls from Trees

Name____________________________________

True or False?

1. A full-body harness is the best type of safety equipment to use while trimming trees.  T  F

2. A safety belt will protect you if you should fall.  T  F

3. You should perform a safety check of all equipment each time before you climb into a tree.  T  F

4. If you trim tree limbs near power lines, only use a wooden or fiberglass ladder.  T  F

5. The top step of a stepladder can be used if necessary.  T  F
Preventing Falls for Trainers and Supervisors

Objective: Use safe practices to prevent falls.

**Trainer's Note**

Falls happen quickly and are unexpected. And they can cause serious injuries. For this module:

- Review the information provided on safety practices to prevent falls.
- Discuss problem areas in greenhouses, nurseries, and other environments.
- Have a worker demonstrate safe ladder practices.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

For more information on preventing falls, refer to the Tailgate Safety Training modules *Proper Use of Ladders, Tree Pruning and Ladder Safety,* and *Preventing Falls From Trees.*

**Background**

Falls can cause serious injuries, as well as damage to facilities and equipment. Workers can fall off things or fall into openings. They can trip over obstructions or lose their footing on slippery surfaces. Some basic guidelines can help prevent falls.

**Housekeeping**

- Add rubber mats to smooth-finished concrete floors.
- Clean up spills immediately.
- Use absorbent material to reduce slipping.
- Dry floors prevent slipping.
- Be alert to potential problems like:
  - Wet floors
  - Tangled or loose hoses
  - Moss or algae on floors
  - Mix of water and growth media
- Be aware of the work environment, personal safety, and the safety of co-workers.
Floor Openings

Floor openings should be guarded by a standard fixed railing on all exposed sides. Consider using a sturdy hinged floor opening cover with removable standard railings on all exposed sides in high traffic areas. Workers should use an access ladder to get up on scaffolds; they should not climb the side of the scaffold.

Ladders

- Use a ladder with two side rails joined by regularly spaced steps, rungs, or cleats, allowing for up and down movement.
- Never extend the body outside the ladder side rails.

Four-to-One Rule:
For every 4 feet of rise, the base of the ladder should be 1 foot away from the object the ladder is resting against.

- Use the Four-to-One Rule to place the ladder. Place the bottom of the ladder 1/4 of its vertical height from the building (i.e., 4 feet for 16-foot ladder).
- The top of a lean-to ladder should be 36 inches higher than the level at which the employee is working.
- Do not stand on the top two rungs of a stepladder.
- Observe the location of electrical wires. Stay clear of electrical lines and lighting fixtures.
- Keep metal ladders away from electrical wires.
- Watch out for movable equipment like portable benches or traveling booms.

Scaffolding

Scaffolds are temporary, elevated platforms used for supporting workers and/or materials. Scaffolds must have guardrails and toe boards. Guardrails are a barrier secured to uprights and erected along the exposed sides and ends of platforms to prevent falls.

Mobile Scissors Lifts

Greenhouse and nursery workers often use mobile scissors lifts in performing their jobs. If you use this type of equipment, be sure to follow the equipment safety instructions.

- Make sure all handrails and other safety devices are in place and operating.
- Be aware of other workers in the work area.
- Be aware of uneven surfaces as you move the lift.
- Be aware of beams, trusses, and gutters that may be below head level.
Stairs

- Walk — don’t run — when using stairways.
- Use handrails.
- Open, exposed stairs should have a railing. Handrails should be provided on at least one side of closed stairways, preferably on the right side descending.
- Uncluttered stairways with good tread are safest.

General Tips to Prevent Falls

- You are more likely to slip when rushed or distracted, so do not run.
- Avoid rapid changes of direction.
- Keep floors in good repair.
- Wear shoes with pliable soles and low heels.
- Close open drawers, cabinets, doors, or closets after use.
- Watch out for movable equipment like portable benches or traveling booms.

Review These Important Points

- Keeping the work area free of spills helps prevent slips and falls.
- All open spaces should have a fixed railing around them.
- Always use an approved ladder.
- Scaffolding must have guardrails and toe boards.

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</table>
Preventing Falls

Name____________________________________

True or False?

1. To prevent slipping, all floors should be kept dry. T F
2. Use an approved ladder. T F
3. Shop floors and steps are safe storage areas. T F
4. When spills occur in the shop it is best to use an absorbent material to reduce slipping. T F
5. Being alert is one of the surest ways to avoid falls. T F
Preventing Machine Hazards for Trainers and Supervisors

Objective: Prevent hazards involving machinery.

**Trainer's Note**

Machinery is very helpful but potentially dangerous. For this module:

- Review the safety guidelines below on reducing hazards and preventing accidents.
- Have experienced workers assist in this session, using machinery in your own workplace:
  - Demonstrate the proper steps for checking a piece of machinery before operating it.
  - Demonstrate maintenance procedures.
  - Operate equipment to show the hazard areas.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

There are thousands of machine-related injuries each year. Proper training can prevent these injuries. Workers should know how to operate a piece of machinery and inspect for problem areas before turning on the power. Keeping air hoses and extension cords out of the way reduces tripping hazards.

**Check Before Operating**

- Have you reviewed the owner's manual? It will provide operating, repairing, lubricating, and fuel information.
- Are the Warning decals in place?
- Are the machine guards properly placed and in good condition?
- Are electrical lines damage free?
- Are air and hydraulic lines in good condition and not leaking?
- Is the setup a proper setup?
- Is the area around the machines orderly?
- Is the equipment jack in working order?
Personal Protection

- Wear Personal Protection Equipment, such as goggles, safety shoes, and leather gloves. For more information, see all the Tailgate Safety Training modules on personal protection.
- Long hair should be tied back or tucked under to avoid getting caught in machinery.
- Avoid wearing jewelry.

Machine Maintenance Safety Checklist

- Keep machines repaired, lubricated, and adjusted.
- Clean up excess lubricants.
- Clearly mark control switches and valves that control machines.
- Check machines for emergency stop switches; they should be located on or near the machine so the machine can be turned off quickly if a malfunction occurs.

During Operation

- Turn power off and remove the key before working around or performing maintenance on the machine.
- Use appropriate lockout and tagout procedures to prevent equipment from being re-energized while work is being performed on or around it. For more details, see the Tailgate Safety Training module Lockout and Tagout.
- Stay away from moving parts.

Review These Important Points

- Always wear PPE on the job.
- Avoid wearing jewelry, hair styles, or loose clothing that might get caught on machinery.
- Keep work space clutter free.
- Know how to use the machine safely before operating.

About These Modules

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Answer Key: 1 = T, 2 = T, 3 = F, 4 = T, 5 = T.
Preventing Machine Hazards

Name____________________________________

True or False?

1. Before using a piece of machinery, know how to operate it safely. T F
2. Avoid wearing jewelry when working with machines. T F
3. Wear tennis shoes when working on heavy machinery. T F
4. Knowing the location of the emergency stop switches could save a life. T F
5. Keep machines well maintained to guard against hazards. T F
Proper Use of Ladders for Trainers and Supervisors

Objective: Use ladders safely for construction and maintenance jobs.

Trainer's Note

Accidents can happen when someone falls from a ladder or uses it wrong. For this module:

- Present the information below on ladders and safe ladder practices.
- Demonstrate ladder hazards and ladder safety.
- Have workers practice using the Four-to-One rule while you observe.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Most ladder accidents happen when someone falls from a ladder or when the ladder falls because it is being used incorrectly.

Before Climbing a Ladder

- Consider the type of work to be done when choosing a ladder.
- Be certain the ladder is able to carry the amount of weight that will be applied. Check ladder ratings for weight allowed.
  - **Industrial.** Heavy-duty with a load capacity of not more than 250 pounds.
  - **Commercial.** Medium-duty with a load capacity of not more than 225 pounds (suited for painting).
  - **Household.** Light-duty with a load capacity of 200 pounds.
- Check the condition of the ladder using the Ladder Inspection Checklist on the next page.
- Make sure the ladder is placed on a firm, level, slip-free surface away from things like algae growth, oil droplets, potting mix, or wet grass clippings.
- **Check for overhead power lines** outdoors and remain clear of them.
- Check for lighting fixtures indoors and remain clear of them.
### Ladder Inspection Checklist

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<th>OK</th>
<th>Not OK</th>
<th>Wood Ladders</th>
<th>OK</th>
<th>Not OK</th>
<th>Fiberglass Ladders</th>
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<tr>
<td>Sharp edges?</td>
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<td>Splits?</td>
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<td>Loose components?</td>
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<td>Dents?</td>
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<td>Cracks?</td>
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<td>Missing components?</td>
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<td>Bent steps or stiles?</td>
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<td>Chips?</td>
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<td></td>
<td>Cracks?</td>
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<tr>
<td>Condition of no-slip or slip-resistant rubber or plastic feet?</td>
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<td>Loose steps or rungs?</td>
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<td>Chips?</td>
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### Step Ladders
- Be certain the spreader is locked before climbing on the ladder.
- Never stand on the top of a stepladder.
- Note: The top is not a step!

### Extension and Straight Ladders
- Raise the extension ladder to the desired height and lock both sides.
- Never stand on the top three rungs of a straight or extension ladder.
- Don't lean a ladder against a movable object.
- Always face the ladder and hold onto the side rails with both hands, when going up or down the ladder.

#### Four-to-One Rule:
For every 4 feet of rise, the base of the ladder should be 1 foot away from the object the ladder is resting against.
Proper Ladder Placement

The ladder should be placed according to the Four-to-One Rule. First, measure the rise of the ladder — the height from the ground up to the point where the ladder rests against the object. For every 4 feet of rise, the base of the ladder should be 1 foot away from the object. For example, if a 16-foot ladder leans against a wall, its base should be placed 4 feet from the wall. Keep ladders away from power lines.

Remember

- Never use a ladder in a strong wind unless it is tied securely.
- Never use a ladder in front of a door unless the door is locked, blocked, or guarded, and signs are posted.
- Inspect ladders for potential dangers before using.
- Keep your body centered between the rails of the ladder.
- Always have three points of contact while on a ladder — for example, two feet and one hand.
- Never carry tools or materials in your hand when going up or down a ladder. Use a tool belt or apron with a pocket.
- Only one person should be on a ladder at a time.
- If you must work near power lines, always use a wooden or fiberglass ladder. Never work with a metal ladder around power lines.

Review These Important Points

- Choose the right ladder for the intended job.
- Know the potential hazards when using a ladder.
- Know the proper placement of ladders.

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Proper Use of Ladders

Name____________________________________

True or False?

1. Stand on the top three rungs of a straight or extension ladder. T F

2. The Four-to-One Rule should be applied when leaning a ladder against an object. T F

3. Keep the body centered between the rails of the ladder. T F

4. It is a good idea to use a ladder in windy conditions. T F

5. A wood ladder is safe to use if it has cracks and splits, as long as it doesn’t have any missing rungs. T F
Properly Cleaning and Storing Respirators for Trainers and Supervisors

Objective: Clean and store respirators according to the presented guidelines.

**Trainer’s Note**

Respirators remain effective and unsoiled if they are properly cleaned and stored. For this module:

- Present the information below on common mistakes with respirators.
- Stress correct procedures for cleaning and storing.
- Demonstrate proper cleaning and storage procedures.
- Have workers practice cleaning and storing procedures while you supervise.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Here are some common mistakes with respirators.

- On a hot and humid day, a worker haphazardly removes a respirator. The respirator is hung on a nail next to a pesticide container.
- A worker tosses a respirator on the dashboard of the truck. The truck is parked in a very sunny spot.
- A respirator is in an enclosed cab. The cartridge is inside the sleeve of a plastic glove. The respirator has been there for two months.

Why are those mistakes? How can they be corrected?

Dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals can affect respirators. They must be cleaned properly after each use. They must be stored in a clean dry place. They must be stored away from personal clothing and pesticide-contaminated areas. Disposable respirators, or dust filter masks, must be discarded after one use. Cartridges must be discarded when they show sign of being used up.

The Occupational Safety and Health Administration (OSHA) requires employers to maintain a written Respiratory Protection Program for cleaning, storing, and maintaining respirators. Workers can consult the written program for details on procedures and requirements.
A dual cartridge respirator uses an absorbent material plus dust filters to purify the air.

A single cartridge respirator with full face shield also covers eyes, nose, and mouth.

A disposable dust mask traps particles out of the air.

**Cleaning Cartridge Respirators**

- Respirators should be cleaned after each use except disposable respirators or dust filter masks.
- Discard disposable respirators or dust filter masks after one use.
- Non-alcohol wipe pads can be used during intermittent use.
- Disassemble the respirator, following the manufacturer's instructions.
- Inspect the parts. Replace damaged or worn parts.
- Follow the manufacturer’s instructions for cleaning.
- Wash reusable face pieces. They should be cleaned with a mild disinfecting soap. They should be rinsed and air dried before storing.
- Do not use strong cleaning agents and solvents. They can damage rubber or plastic respirator parts.
- Clean the inhalation and exhalation valves in a mild soap solution. Don’t damage the valves during cleaning.
- Air-dry the parts that have been cleaned. They must be completely dry before they can be reassembled.
- After reassembling, check seals and gaskets for tightness and leaks.
- Wash hands before and after cleaning.

**Cartridges and Filters**

- Cartridges and filters cannot be cleaned.
- Dispose of cartridges and filters when they are used up:
  - When you can smell or taste contaminants.
  - When your eyes, nose, or throat become irritated.
  - When they show any sign of damage.

**Storing Respirators**

- Before you store respirators, clean them and let them dry. Store them as soon as they are dry so they don’t collect dust.
- Store clean, dry respirators in nonporous, sturdy, airtight containers, like a zip-sealed plastic bag.
- Store cleaned respirators separate from cartridges.
- Store respirators in a cool, dry cabinet specifically designated for storage.
- When stored, position the respirator so that it keeps its natural shape.
- Exhalation valves and face pieces should lie in a normal position to prevent the plastic or rubber from being deformed.
• Store respirators to protect them from dust, sunlight, extreme heat or cold, excessive moisture, and damaging chemicals.

Review These Important Points

• Clean respirators after each use.
• Cartridges and prefilters should be disposed of after they are used up and cannot be cleaned.
• After cleaning, store respirators in a cool, dry place.

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Properly Cleaning and Storing Respirators

True or False?

1. Respirators do not have to be cleaned. T F
2. Store respirators in the cab of a tractor. T F
3. Sealing a respirator in an airtight plastic bag prevents it from collecting dirt and dust. T F
4. Cartridges that have been used-up make respirators ineffective. T F
5. The respirator can be cleaned in one piece. T F
Protecting Against Cold for Trainers and Supervisors

Objective: Identify general tips to prevent the harmful effects of cold weather.

**Trainer's Note**

Landscaping and horticulture work often occurs in cold environments. For this module:

- Provide the Cold Stress Card from the Occupational Safety and Health Administration (OSHA) web site, if possible.
- Review the information in the module.
- Ask workers to give signs of harmful effects of cold.
- Review the important points.
- Have workers take the True/False test to check their learning.

**Background**

Working in a cold environment, outdoors or indoors, can be risky. Cold environments can include low temperatures, high winds, dampness, and cold water. Workers need to pay extra attention to working in cold environments to avoid cold-related injuries.

**Body Temperature in Cold Environments**

Working in cold weather can cause cold-related injuries. Keeping normal body temperature of 98.6°F (37°C) in a cold environment is very important. Workers can lose body heat in different ways:

- Convection: working in brisk winds.
- Conduction: using cold hand tools or wearing wet clothing.
- Radiation: working in shady or cloudy, overcast environments.
- Sweating.

The illustration from OSHA’s Cold Stress Equation (see the following page) shows the degree of danger based on the temperature and wind speed.
General Tips to Prevent Harmful Effects of Cold

- Wear adequate, dry clothing to decrease the effects of cold on the body.
- Do not take drugs like nicotine or caffeine that inhibit the body’s reaction to the cold.
- Be aware of work environments that could lead to potential cold-induced injuries.
- Learn the signs of cold-induced injuries and what to do to help workers.
- Wear proper clothing for cold conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves. Also, wear polypropylene underwear to keep water away from the skin.
- Take frequent short breaks in warm, dry shelters to warm up the body.
- Try to schedule work for the warmest part of the day.
- Avoid fatigue because energy is needed to keep muscles warm.
- Use the buddy system — work in pairs so that one worker can recognize danger signs.
- Avoid drinks with alcohol or caffeine such as coffee, tea, sodas, or hot chocolate.
- Drink warm, sweet beverages such as sugar water or sports-type drinks.
- Eat high-calorie foods such as hot pasta dishes.

Review These Important Points

- Workers can lose body heat through convection, conduction, radiation, and sweating.
- Do not take certain drugs or medications such as nicotine, caffeine, and medication that inhibits the body’s reaction to the cold or impairs judgment.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
About These Modules

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Protecting Against Cold

True or False?

1. Working in -30°F (-34.4°C) is not dangerous. T F
2. Normal body temperature is 98.6°F (37°C). T F
3. Drinking hot chocolate is good when working in a cold environment. T F
4. Drinking alcohol helps prevent the harmful effects of cold. T F
5. Take frequent short breaks in warm, dry shelters to allow the body to warm up. T F
Protecting Against Noise for Trainers and Supervisors

Objective: Use proper protection against unsafe noise levels.

**Trainer's Note**

Workers have nothing to lose — but a lot to gain — by protecting their hearing. For this module:

- Review the information below on hearing hazards and hearing protection.
- Demonstrate earplugs and earmuffs.
- Ask the workers to share some of the reasons why they do not wear hearing protection. Show them that hearing protection does not block warning signals, machinery, or speech.
- Measure the level of noise from typical equipment — chain saw, leaf blower, mower, tractor, etc. — with a sound level meter.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Some workers ignore the need for hearing protection. They resist wearing hearing protection because they do not think they need it. Workers might also think that protection will be uncomfortable. This is frightening because hearing loss is gradual; workers can gradually lose some of their hearing before they realize it. By the time workers reach retirement age, they will suffer hearing loss and social isolation.

**Hearing Protection Devices**

There are earplugs and earmuffs that give good protection. They are comfortable and easy to use.

- **Formable plugs** are spongy, soft compressed, or shaped prior to insertion. They are expandable to provide a snug fit. These are disposable. Formable plugs are not for reuse.

- **Pre-molded plugs** are made of soft, flexible material preformed to fit the ear. They must be fitted (sized) for each ear. These plugs are for reuse. They must be washed after each use. Use pre-molded plugs when hearing protection is used on a regular basis.
Earmuffs are adjustable headbands with soft cups and cushions that seal around the ear. Workers may wear plugs under muffs for additional protection. Muffs may be more comfortable to wear over a longer period than plugs. Workers should not wear earmuffs with eyeglasses or any other obstruction. Muffs may be the best choice for occasional users or occasional users of noisy equipment, like a grinder.

Not all materials can block the same amount of sound. The manufacturer indicates how much noise (in decibels) the hearing protection device can block if used properly. This is called the noise reduction rating (NRR). For general use, look for a NRR of 25 or greater. In extremely noisy conditions, workers should use both earplugs and earmuffs.

How Noise Can Hurt You

- Prolonged exposure to loud noise can result in permanent hearing loss.
- Short-term exposure to loud noise can result in temporary hearing loss.
- Short-term exposure to very loud noise can result in permanent hearing loss.
- Too much exposure to loud noise can result in stress, from constantly straining to listen and be heard.
- Noise can cause you to miss important safety instructions.

How to Tell If Noise Is Hurting You

- You may have a problem if:
  - You hear ringing or other noises in your ears.
  - You have a hard time hearing people when they talk to you.
  - You are unable to hear high pitched or soft sounds.
- If you experience any of these problems, tell your supervisor. You may need to have your hearing tested.

Noise is defined as sounds people prefer not to hear. Noise is especially dangerous in the workplace because it interferes with communication and disrupts concentration. Sound is measured in decibels. Noise of 85 decibels or greater affects your hearing if you work around it eight hours a day. Some sample decibel levels are listed below.

<table>
<thead>
<tr>
<th>Noise</th>
<th>Decibels</th>
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<tbody>
<tr>
<td>Conversational voices</td>
<td>60</td>
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<tr>
<td>Idling tractor</td>
<td>80</td>
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<tr>
<td>Conveyor</td>
<td>80</td>
</tr>
<tr>
<td>Diesel truck</td>
<td>90-95</td>
</tr>
<tr>
<td>Power lawn mower</td>
<td>90-95</td>
</tr>
<tr>
<td>One leaf blower</td>
<td>90-100</td>
</tr>
<tr>
<td>Power tools</td>
<td>100</td>
</tr>
<tr>
<td>Chain saw</td>
<td>110</td>
</tr>
</tbody>
</table>
Protective earmuffs or earplugs can reduce noise levels to the inner ear if used properly. Use hearing protection when noise exposure cannot be controlled adequately by environmental changes or administrative changes, like moving farther away from the noise. It is a good idea to wear hearing protection when average noise levels exceed 85 decibels for prolonged periods.

Good protection against noise depends on the seal between the surface of the skin and the surface of the hearing protector. Be cautious because protectors can become loose and create leaks. Having a leak does not protect the ears from harmful noise levels. Talking and even chewing can create a leak in the protection. Earplugs should be made of a soft material like neoprene. Earplugs should also be properly designed, well fitted, and clean.

**Review These Important Points**

- Noise that exceeds 85 decibels for prolonged periods can cause hearing loss.
- Good protection against noise depends on the seal between the surface of the skin and the surface of the hearing protector.
- It is important that hearing protection is worn properly and regularly.
- If workers hear noise in their head or ringing noises in their ears at the end of the workday, they may have been exposed to too much noise. Precautionary measures should be taken.

**About These Modules**

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Protecting Against Noise

Name____________________________________

True or False?

1. All hearing protection is the same, so there is no reason to worry about the noise reduction rating (NRR). T  F

2. Protecting your hearing reduces noise level to the inner ear. T  F

3. Hearing loss is gradual, and by the time it is realized, the ability to hear has already diminished. T  F

4. Most employees resist wearing earplugs because they believe they are not needed. T  F

5. Muffs and plugs can be worn together for additional protection. T  F
Protecting Hands and Fingers for Trainers and Supervisors

Objective: Protect hands and fingers from injuries.

**Trainer’s Note**

Machinery with moving parts can injure or amputate hands and fingers. Using hands and fingers as tools can also cause injury. For this module:

- Use the guide below to bring attention to danger zones. Review a list of hand and finger safety precautions.
- Provide examples to illustrate pinch points on machinery.
- Workers may offer some other examples of accidents that lead to hand or finger injury.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Workers often use machinery with moving parts that can pinch, cut, or crush hands and fingers. Workers can also injure fingers and hands by using them inappropriately as tools. To protect fingers and hands, workers must be aware of a variety of hazards and use safe practices.

**Safe Practices for Machinery**

- Identify the pinch points, cut points, and crush points on:
  - Mechanically moved loads
  - Loads being lowered
  - Metal drums
- Pinch points, cut points, and crush points are created when two objects move together.
• Keep fingers and hands away from all pinch points, cut points, and crush points!
• Perform maintenance only when tools or machinery are not in operation.
• Know when to wear gloves. Gloves should be worn when exposed to hazards that cause cuts, scrapes, chemical burns or absorption, or injuries. Do not wear loose-fitting gloves around reciprocating or rotating machine parts.
• Allow rotating parts to come to a stop before working on them. Use appropriate lockout and tagout procedures.
• Stop all machinery such as power lawn mowers before attempting to unclog them.
• If guards are removed to perform maintenance, replace them immediately after servicing.
• Do not disengage safety shutoffs on lawn mowers and other power equipment. That defeats the purpose of the shutoff.
• Do not wear jewelry on fingers, ears, eyebrows, navels, etc., when operating or repairing machinery.

**Hands and Fingers Are Not Tools!**

• Use a tapered punch or other appropriate tool to align the holes in parts.
• Remove fuses with fuse removers, not fingers.
• Do not test the temperatures of gases, liquids, or solids with hands. Burns and reflex damage can occur immediately.
• Keep grinder tool rests adjusted to 1/8-inch gap or less.
• Handle sharp or pointed tools (hatchets, chisels, punches, awls, knives, pruning equipment, and machine blades) carefully.
• Never use fingers to retrieve objects from mower blades, knife blades, or parts moving together, such as a punch press, rotating parts of drill bits, and reciprocating parts of in-running rolls. Use pliers, tweezers, or similar tools.

**Review These Important Points**

• Avoid using fingers to retrieve objects near saw blades, knife blades, parts moving together, rotating parts, and reciprocating parts.
• Use and maintain guards on moving machinery parts.
• Do not use hands or fingers to test temperatures.
• Handle sharp or pointed tools carefully.
• Watch for pinch points, cut points, and crush points.
• The power transmission, moving parts, and the point of operation on all machinery or tools should be guarded.

**About These Modules**

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Protecting Hands and Fingers

Name______________________________

True or False?

1. Pinch points are created when two objects move together. T F
2. Replace all guards immediately after service. T F
3. Never use hands or fingers to test temperatures. T F
4. Do not wear loose-fitting gloves around reciprocating or rotating machine parts. T F
5. Align holes with fingers. T F
Protecting the Head for Trainers and Supervisors

Objective: Use head protection to prevent injuries.

Trainer’s Note

Hard hats help prevent head injuries on the job. For this module:

- Explain the information below on when and where to wear a hard hat.
- Show workers how to inspect a hard hat for safety.
- Demonstrate a proper hard hat fit.
- Have each worker try on and adjust a hard hat to proper fit.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Hard hats protect the head from overhead objects and from falling or flying objects in situations like these:

- Working below other workers or machinery, such as bucket lifts.
- Working in or under trees with work going on overhead.
- Working around or under conveyor belts.
- Working around exposed energized conductors.
Wear hard hats made of slow-burning, water-resistant molded plastic. They protect the head in various ways.

- The hard outer shells resist blows and penetration from above.
- Shock-absorbing suspensions (headband and straps) act as an impact barrier between the hat and the head.
- Slow-burning materials protect against fires and electrical burns.
- Water-resistant materials provide insulation from electrical hazards.

Hard hats come in different classes with different levels of protection.

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<tr>
<th>Class</th>
<th>Level of Protection</th>
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<tbody>
<tr>
<td>A</td>
<td>Resists impact and penetration. Provides limited resistance to electricity.</td>
</tr>
<tr>
<td>B</td>
<td>Resists impact and penetration. Provides high resistance to electricity.</td>
</tr>
<tr>
<td>C</td>
<td>Resists impact and penetration only. Provides no resistance to electricity. Usually made of aluminum. Do not wear around electricity.</td>
</tr>
</tbody>
</table>

Wearing Hard Hats Safely

- Wearing a hard hat helmet over a cap or parka hood defeats the suspensions. Instead, use a liner to keep the head warm.
- Chin straps are also available to keep the hat in place.
- Inspect the hard hat before use. Wear the hat if:
  - The headband is not stretched or worn.
  - The headband fits comfortably.
  - The shell is not dented, cracked, or visibly damaged.
- Check the hat for damage after use. If the hat is damaged, destroy it.
- Wash the shell frequently using hot soapy water only; rinse thoroughly.
- Store the hat carefully in a cool, dark, dry place.

Review These Important Points

- Know when to wear a hard hat.
- Choose the best hard hat for the job.
- Wear hard hats that are in good repair.
- Discard damaged hats.

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Protecting the Head

True or False?

1. Do not wear a hard hat when working below conveyor belts.  
   T  F

2. Helmets worn over hats still offer protection.  
   T  F

3. A class C hard hat should be used when working with electricity.  
   T  F

4. Hard hats should be inspected before each use.  
   T  F

5. Hard hats should be stored in cool, dry places.  
   T  F
Protective Gloves for Trainers and Supervisors

Objective: Identify what types of gloves are needed for the job, if any at all.

Trainer’s Note

Many jobs in the green industry require the use of gloves. For this module:

- Review the information below on the different types of gloves and the protection each offers.
- Give examples of when gloves are needed and when they should not be used.
- Display various types of gloves during the session and discuss their proper use.
- As you display each type of glove, ask workers to identify an appropriate use for the type of glove.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Gloves can protect hands and forearms from cuts, abrasions, burns, puncture wounds, skin contact with hazardous chemicals, and some electrical shocks.

Not every job requires gloves. In some cases, it may be dangerous to wear gloves. Never wear gloves while working with or around moving machinery, such as mills, lathes, moving conveyors, or power-take-off (PTO) shafts. If the glove got caught in the machinery, it could pull the hand and arm in, causing amputation.
Choosing Protective Gloves

Gloves are made of a variety of materials. It is important to know what kind of protection each glove type can offer. Using the wrong glove can cause injury. Cotton gloves could absorb dangerous chemicals causing the skin to burn. Using the correct glove reduces hazards in the workplace. It is the employer’s responsibility to determine how long gloves can be worn and if they are reusable. However, employees should inform the employer if they feel their gloves should be replaced.

<table>
<thead>
<tr>
<th>Type of Glove</th>
<th>Level of Protection</th>
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<tbody>
<tr>
<td>Metal mesh and Kevlar knit</td>
<td>Prevents cuts from sharp objects like knives, blades, cutter bars when cutting, sharpening, mowing, trimming.</td>
</tr>
<tr>
<td>Leather</td>
<td>Protects against:</td>
</tr>
<tr>
<td></td>
<td>• Handling rough objects like stones or wood chips.</td>
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<tr>
<td></td>
<td>• Stones thrown up while mowing; chips or splinters from sawing.</td>
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<td></td>
<td>• Sparks from welding or grinding.</td>
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<td></td>
<td>• Moderate heat from equipment you use.</td>
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<tr>
<td>Cotton fabric</td>
<td>Protects against dirt, splinters, and abrasions when handling materials. Helps grip slippery objects. Do not use when working with rough, sharp, or heavy materials.</td>
</tr>
<tr>
<td>Rubber, neoprene, vinyl</td>
<td>Protects from chemicals being used or handled. Check chemical package for specific instructions.</td>
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Review These Important Points

- Choose the right glove for the job.
- In some situations using gloves can be dangerous.
- Check with specific recommendations for the type of glove to use when working with chemicals.

About These Modules

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Answer Key: 1 = T, 2 = T, 3 = T, 4 = T, 5 = T.
Protective Gloves

Name____________________________________

True or False?

1. Use neoprene, vinyl, or rubber gloves when working with chemicals. T F
2. Leather gloves protect hands from rough objects, chips, sparks, and moderate heat. T F
3. Metal mesh or Kevlar knit gloves protect against cuts from knives or other sharp objects. T F
4. Not every job requires the use of gloves. T F
5. Cotton fabric gloves protect against dirt, splinters, slippery objects, or abrasions. T F
Objective: Use safe practices with power-take-off shielding.

**Trainer’s Note**

Power-take-off shielding is designed for safety — but it must be used. For this module:

- Review the information below on how to use power-take-off shielding safely.
- Point out the shields on a tractor or other power source with power-take-off.
- Demonstrate safety practices.
- Ask workers to give examples of mishaps that can occur when shielding is not in place.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Workers can be injured or killed if they are caught in a power-take-off (PTO). PTO shields are designed to prevent accidents. But PTO shields cannot work if they are not in place. And PTO shields cannot work if they are damaged.

For more information, refer to the Tailgate Safety Training module *Safe Use of the Power-Take-Off (PTO).*

**Use Caution With PTOs**

- Disengage the PTO before getting off a tractor. This reduces the chance of slipping or falling onto a rotating shaft or getting caught in a moving part.
- Integral shields should move freely. When the power is off, the shield should easily rotate by hand. Repair damaged shields or bearings immediately.
• Keep the PTO master shield on the PTO power source in place.
• The equipment operator should wear close-fitting clothes and slip-resistant footwear. Rotating parts catch loose clothing easily.
• Never step across a rotating power shaft. Equipment may require the PTO to run at full speed while the operator is working in the vicinity, so it is crucial to always walk around the revolving shaft.
• Never allow children around the equipment or work area.
• Replace damaged or missing shields immediately. If there are questions about the machinery, check with your employer or equipment dealer.

Review These Important Points

• Keep all shields in place at all times except when servicing.
• Replace all shields immediately after servicing a PTO shaft.
• Never step over a working PTO.
• Always disengage the PTO before getting off a tractor.
• Wear close-fitting clothing when working around a PTO.
• Keep children away from a PTO.

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Power-Take-Off (PTO) Shielding

Name____________________________________

True or False?

1. Wear loose-fitting clothing when working around PTOs. T F
2. Allow children to play around PTOs. T F
3. Keep any shielding on PTOs in place or replace immediately after servicing. T F
4. Stepping over a rotating power shaft is acceptable. T F
5. Always disengage the PTO before getting off a tractor. T F
Reading Pesticide Labels for Trainers and Supervisors

Objective: Identify important information in pesticide labels and the meaning of that information.

**Trainer's Note**

Pesticide labels explain how to use pesticides safely. For this module:

- Review the information below on:
  - When to read pesticide labels.
  - What information they contain.
- Show some labels and discuss what they say. Discuss how to use the information and why it is important.
- Review the Material Safety Data Sheet (MSDS) for the same product. Compare the information on the MSDS and the label.
- Have workers take the True/False quiz to check their learning.

**Note:** Do not use the label on an open container for demonstration purposes. Obtain sample labels from a dealer or from the Internet. Or, use labels on unopened containers.

Background

Before applying pesticides, workers must know what the label says. The label is the law!
The label shows a number of things:

- The chemical formulation
- Signal words: DANGER, WARNING, CAUTION
- Precautionary statements
- Personal Protection Equipment (PPE) statements
- Application method
- Projected length of exposure.

Workers can use pesticides safely and correctly if they read the label.

**When to Read the Label**

- **Before purchasing the pesticide.** The pesticide must be registered for your intended use. You must make sure there are no restrictions that would prohibit its use.
- **Before mixing and applying the pesticide.** Understand how to mix and safely apply the pesticide. Know the first aid needed if an accident occurs.
- **When storing pesticides.** Pesticides can break down and contaminate storage areas. They are also fire hazards. So they must be stored properly. The pesticide storage center should be securely locked. You should store pesticides by hazard classes:
  - Solvent-based products like Dimethoate 2.67 EC
  - Corrosive alkalis like bleach or lime
  - Corrosive acids like muriatic acids
  - Fertilizers
- **Before disposing of unused pesticide and empty containers.** Workers must prevent environmental contamination and human health hazards. Reduce carryover; buy only what is needed for this season. Try to find a use for all of the pesticide. Never pour pesticides down a drain. Pesticides are hazardous waste. Follow state and federal regulations when you use them and dispose of them.

For more details on pesticide safety, see the Tailgate Safety Training module *Mixing and Spraying Pesticides.*

**What Information Does the Label Contain?**

- **Brand name.** The name the manufacturer gives to the pesticide.
- **Chemical name.** The name chemists use to describe the chemical structure of the pesticide.
- **Common name.** Most pesticides also have an official common name. For example, horticultural oil is a common name. Common names and brand names are not the same. Not all labels list a common name.
- **Formulation.** Labels always list the formulation type. Some examples are emulsifiable concentrate (EC), wettable powder (WP), or soluble powder (SP).
- **Ingredients.** The label lists the percentage of active and inert ingredients by weight. Inert ingredients do not have pesticidal action.
- **Contents.** The label lists the net contents, by weight or liquid volume, contained in the package.
- **Manufacturer.** The label always lists the name and address of the manufacturer.
• **Registration and Establishment Numbers.** The Environmental Protection Agency (EPA) and other agencies assign these numbers. Keep track of EPA numbers if there are problems or recalls.

• **Signal Word.** The registration process determines how toxic each pesticide is. Standard signal words must be used on the label:

<table>
<thead>
<tr>
<th>Category</th>
<th>Signal Word</th>
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<tr>
<td>High toxicity</td>
<td>DANGER</td>
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<tr>
<td>Moderately toxic</td>
<td>WARNING</td>
</tr>
<tr>
<td>Low toxicity</td>
<td>CAUTION</td>
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<tr>
<td>Relatively non-toxic</td>
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• **Precautionary statements.** These describe the hazards associated with the chemical. They tell why the pesticide is hazardous. They list adverse effects. They state what PPE must be worn.

• **Statement of practical treatment.** This tells what to do in case of accidental exposure.

• **Statement of use classification.** The EPA classifies pesticides as either General-Use or Restricted-Use. Restricted-use pesticides can harm people, animals, or the environment.

• **Directions for use.** The directions tell how to apply the pesticide. They include how much to use, where to use it, and when to apply it. They also include the preharvest interval for all crops whenever appropriate.

• **Misuse statement.** This tells users to apply pesticides according to label directions.

• **Re-Entry Interval (REI) statement.** Sometimes, a certain amount of time must pass before a person can re-enter an area treated with a pesticide. This is the REI. The REI is included on the label or in state regulations.

• **Storage and disposal directions.** Improper storage can cause some pesticides to lose their effectiveness. It can also cause an explosion or fire. The label contains directions for proper storage and disposal.

• **Warranty.** The label informs you of your rights as a purchaser. It also limits the manufacturer’s liability.

The Material Safety Data Sheet (MSDS) also contains information on the pesticide. For more detail, refer to the Tailgate Safety Training module *Material Safety Data Sheet (MSDS).*

**Review These Important Points**

• Always read the labels before applying pesticides.

• Know what the warnings are and what they mean.

• Signal words identify the toxicity level. They represent relative risk.

• Know the signs of exposure before opening a container. Watch for those signs while working with the pesticide.

• Know the recommended response to accidental exposure before working with or around pesticides.

**About These Modules**

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Reading Pesticide Labels

Name____________________________________

True or False?

1. Storage and disposal instructions will not be found on the label. They are unimportant. T F

2. You should read the label to know how to mix and safely apply the pesticide. T F

3. Re-entry restrictions only apply to workers who work full time in the restricted area. T F

4. Danger on the label means high toxicity. T F

5. Read the label to find out what Personal Protection Equipment to use. T F
Repetitive Motion for Trainers and Supervisors

Objective: Identify the potential for injury in tasks requiring repetitive motion.

Trainer's Note

Repetitive motion can cause injuries from annoying to debilitating. For this module:

- Discuss the information below on causes and symptoms of repetitive motion injuries.
- Discuss how to avoid or correct problems.
- Ask workers to discuss their own experience with repetitive motion injuries.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Repetitive motion injuries occur when some action, usually involving bending or twisting, is done repeatedly. It can also be called cumulative trauma disorder or CTD. Pain or other warning signs may develop slowly. Many areas can be affected but the most common are fingers, hands, wrists, elbows, arms, shoulders, back, and neck.

If pain occurs in any area, do not ignore it. The pain will not go away. Instead, it will get worse. The injury will become more severe as time passes.

Repetitive Motion That Can Lead to Injuries

- Repetitive action of the hand or arm
- Bending at the wrist
- Grasping or pinching objects
- Frequently raising the arm and/or the shoulder
- Applying force with the hand or arm
- Examples
  - Pruning
  - Potting plants
  - Packing plants into boxes
Symptoms of an Injury

- Waking due to pain
- Numbness
- Tingling
- Swelling or tenderness
- Continuous aches
- Loss of strength
- Loss of joint movement
- Crackling
- Decreased coordination

Prevention

Prevention means working and playing smart. To eliminate repetitive motion injuries, try to adapt work activities. Plan how to use or move equipment so that the same motions are not repeated over and over. Be aware of repetitive motion used on and off the job. Repetitive motion trauma is most likely to occur after applying pressure or doing the same motion over and over. If pain occurs in spite of prevention, contact your doctor for an evaluation. Receiving an early evaluation and treatment is important.

Treatment

Your doctor may prescribe medication to help reduce inflammation and pain. Regular follow up visits with your doctor should be scheduled to check your progress. For more serious cases you may be referred to an occupational therapist.

In most cases the doctor will remove a person from the situation that is causing the injury. Time away from the situation, followed by a gradual return to an improved work situation, will be suggested by the doctor. Strengthening hand and arm muscles with exercise may be another suggestion. An improved work situation could be accomplished by simply changing motions so the same motion isn’t continuously repeated. Including short rest breaks into your daily routine may also help.

Consider These Tips

- Avoid repeating the same motion for a long period of time.
- Work in a comfortable position.
- Force can cause injury to nerves, muscles, and tendons.
- Get plenty of rest.

Review These Important Points

- Work smart before using tools and equipment.
- Be aware of the repetitive motions included in your work.
- If pain or numbness occurs, see a doctor.
- Change work habits to change the repetitive motion.
About These Modules

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Repetitive Motion

Name______________________________

True or False?

1. Tingling or numbness in the fingers, hand, or arm is a sign of repetitive motion injuries. T F

2. Preventing repetitive motion problems starts with learning to work and play smart. T F

3. There is no need to worry about changing work habits to change a motion that is repeated over and over. T F

4. Not having enough rest limits recovery from the motions and pressure that can lead to problems. T F

5. Repetitive motion injuries are caused by the simple actions of bending or twisting the body. T F
Respirator Fit for Trainers and Supervisors

Objective: Wear the correct respirator for the job and make sure it fits properly.

**Trainer's Note**

Many daily jobs require the use of respirators to protect workers’ lungs. For this module:

- Review the information below on types of respirators and safe practices for using and fit-testing respirators.
- Have respirators on hand to try on for fit and to show the different types.
- Demonstrate how to fit-test a respirator.
- Supervise workers while they each practice fit-testing different respirators.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Many jobs involve harmful pesticides and chemicals. Employers must determine what respiratory protection is needed for the job. Workers must use that protection to prevent harmful effects. Workers must fit-test their respirators each time they put one on.

**Dust/Mist Respirator**

A dust/mist respirator will always have two straps. Used properly, it protects your lungs by removing small particles from the air you breathe. It can protect you from:

- Most dusts, including perlite, vermiculite, and stone dusts
- Mists
- Pollen
- Some low toxicity pesticides

**Dual and Single Cartridge Respirators**

Dual and single cartridge respirators are available to handle a long list of contaminants. They are used in the green industry for protection against pesticides, ammonia, toxic paints, and solvents. However, they are not suitable for use in enclosed spaces where toxic gases may crowd out the oxygen. Nor are they designed for use against gases that are extremely toxic even in small concentrations. They should only be used for contaminants that their cartridges are specifically designed to handle.
Air-Supplied Respirator

An air-supplied respirator should be worn in oxygen-limited environments. It is also appropriate for use with manure. An air-supplied respirator must be used if:
- Cartridges are not available for the chemical.
- Pesticide or organic vapor concentrations exceed 0.1 percent.
- Toxic gases are present in an enclosed space.

Do Not Use a Respirator If

- You have a beard, mustache, long sideburns, or a deep facial scar or deformity that prevents a tight fit.
- You have lung disease, heart trouble, or breathing problems. A doctor's advice may be needed before using a respirator in these situations.
- It has not been approved for the specific hazard you are protecting yourself against.
- Your eyeglasses interfere with proper fit. Fit the respirator first, then put eyeglasses on over the respirator.

Fit Tests

It is critical to perform a fit test each time you put on a respirator. You need to check for a tight seal between the facepiece and your face.

Dust/Mist Respirator Fit Test

- Check for proper fit each time you put on a dust respirator.
- Cup both hands in front of the mask. Be careful not to push on the mask or move it.
- Inhale deeply. Check to see if the facepiece collapses toward your face.
- Smile, then frown.
- If the mask is drawn in and no air is leaking in around the edges, you have a proper fit.
- If you don't have a proper fit, try readjusting the straps or repositioning the respirator on your face.
- Repeat the test until you have a proper fit.
- Check the written material that comes with the respirator for other specific fitting instructions.

Dual Cartridge Respirator Fit Test

- Do a positive pressure test.
  - Put on your respirator and block off the exhalation valve with the palm of your hand, as shown in the preceding picture.
  - Gently exhale, then hold it for about 10 seconds.
  - Place your hand on the facepiece to see if it is bulging slightly.
  - Smile, then open your mouth. If you notice a slight bulge and you don’t detect any air leaks, you have a proper fit.
• Do a negative pressure test.
  ♦ Place the palms of your hands over the cartridge openings (as shown in the previous picture), and gently inhale, holding your breath for 10 seconds.
  ♦ You will notice that the facepiece is collapsing slightly.
  ♦ Smile, then open your mouth. If the facepiece is collapsing slightly and you don’t detect any air leaks, you have a proper fit.
• Caution! You must do both a positive and a negative pressure test to ensure a proper fit. If needed, make adjustments and repeat both tests until you have a tight fit with no leaks.

Review These Important Points

• Respirators help protect your lungs.
• Choose the proper respirator for the hazards you are working around.
• Use the correct cartridge depending on what it will protect you from breathing in — pesticides, ammonia, dust paint sprays, or other contaminants.
• Read the instructions that come with the respirators and also the labels of pesticides and other contaminants.
• Be sure there’s a tight seal between your face and the facepiece. Perform the fit tests!

About These Modules

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Respirator Fit

True or False?

1. It is important to perform respirator fit tests to check for a tight seal between the facepiece and your face.  
   True or False?  

2. You should not wear a respirator if you have a mustache or a beard.  
   True or False?  

3. After inhaling deeply, while performing the dust respirator fit test, the respirator should have bulged outward.  
   True or False?  

4. When using a dual cartridge respirator, you should perform a positive and negative pressure test.  
   True or False?  

5. Dual cartridge respirators can be used for any type of toxic gas.  
   True or False?
Rollovers and Rollover Protective Structures (ROPS) for Trainers and Supervisors

Objective: Describe the risk of tractor rollovers and effective means to avoid rollovers and minimize rollover injuries.

**Trainer’s Note**

Tractor rollovers are a critical danger for many landscaping and horticultural services workers. For this module:

- Review the information below on rollovers, ROPS, and means to prevent rollovers.
- Show workers tractors with ROPS.
- If possible, demonstrate a folding ROPS for workers.
- Ask workers to describe any rollovers they have experienced.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Tractor rollovers account for 50 percent of tractor-related deaths in the United States. Distracted operators, speed, and rough or uneven ground are leading causes of tractor rollovers. ROPS do not prevent rollovers, but they are 99.9 percent effective in preventing death or serious injury.

The Occupational Safety and Health Administration (OSHA) requires ROPS and seat belts to be installed on all tractors over 20 HP operated by employees.
Rollover Protective Structures (ROPS)

Rollover protective structures (ROPS) became available in the mid 1960s. ROPS were not available for all new tractors until the mid-1970s. However, ROPS were not standard equipment on new tractors until 1985. Many tractors without ROPS are still in use. They contribute to the fatality rate because they are not ROPS and seat-belt equipped. Use of ROPS and seat belts are 99.9 percent effective in preventing deaths due to tractor overturns.

There are three types of rollover protective structures:

- **Rollover protective frame.** Either two or four post frames are securely mounted to the main body of the tractor. Use the provided seat belt to keep the operator within the protected area.

- **Folding ROPS.** The top portion of the ROPS folds down so less overhead clearance is needed. This allows access to low-clearance areas like orchards or low overhead doors.

- **Rollover protective enclosure.** A rollover protective enclosure utilizes the protective frame but totally encloses the frame with metal and glass. Seatbelts are provided and must be used to contain the operator within the protected area. In addition, a cab enclosure gives protection from weather, dust, chemicals, noise, and vibration.

Enclosures on older tractors were designed for operator comfort, not for rollover protection. They are not considered ROPS. ROPS must meet regulations and standards that certify that they provide adequate protection in a tractor rollover. To find out if a frame or enclosure is certified, look for a certification label, contact the manufacturer, or check for the presence of a manufacturer installed seat belt.

For tractors not equipped with a ROPS, check with the manufacturer or dealer for the availability of ROPS retrofit kits. If they are available, the tractor should be retrofitted. If kits are not available, the tractor should not be operated. Install and use seat belts on tractors with ROPS. Seat belts ensure that the operator stays within the zone of protection offered by the ROPS during a mishap. Seat belts should not be used on tractors without ROPS.

**Reducing the Risk of a Side Rollover**

- Set the wheels as far apart as possible.
- Lock the brake pedals together before high-speed road travel.
- Match speed to operating conditions and loads. Do not let the front wheels bounce.
• Slow down before turning.
• Use engine braking when going downhill.

ROPS can save lives!

• Avoid crossing steep slopes. Watch for depressions on the downhill side and bumps on the uphill side. Turn downhill, not uphill, if stability becomes a problem.
• Stay 10 feet or more away from ditches and steep slopes. Slow down to maintain control.
• Stay 10 feet or more from a riverbank. The bank may be steep. Slow down to maintain control.
• Keep front-end loader buckets as low as possible when moving.
• If the right front tire goes off the road into the ditch, turn downward or hold steady and slowly recover. Do not attempt to turn sharply back onto the roadway.

Reducing the Risk for Rear Overturn
• Always hitch loads at the drawbar.
• Use front weights to increase tractor stability.
• Start forward motion slowly and change speed gradually.
• If possible, avoid backing downhill.
• Drive around ditches.
• Back out or be towed out of ditches or mud.

Review These Important Points
• Install and use seat belts on tractors with ROPS.
• ROPS do not prevent rollovers from occurring.
• Most rollovers involve tractor speed, operator error, or unsafe driving conditions.
• Follow safety steps to prevent rollovers.
About These Modules

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Rollovers and Rollover Protective Structures (ROPS)

Name____________________________________

True or False?

1. There are two types of rollover protective structures used on tractors. T  F
2. Seat belts are to be worn on tractors with ROPS. T  F
3. Fifty percent of all tractor related deaths in the United States are caused by rollovers. T  F
4. To find out if a tractor frame or enclosure is certified, read the label posted on the equipment. T  F
5. Turn uphill if stability becomes a problem on a slope. T  F
Rotary Lawn and Brush Mower Safety for Trainers and Supervisors

Objective: Identify hazards associated with rotary mowers and methods for reducing those hazards.

**Trainer’s Note**

Rotary mowers include sit-down mowers and towed mowers. A rotary mower is a useful piece of equipment to landscapers, but misuse can be deadly. For this module:

- Review the information below on rotary mowers, hazards, and safety tips.
- Demonstrate the safe use of a rotary mower. Present the demonstration in the shop or in an open field.
- Ask an employee who normally operates the rotary mower to assist with the session.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Knowing the capabilities of the mower allows for the use of the right mower for the job. The operator’s manual will help determine if the mower is designed for the job. Keep bystanders away from:

- Mowing/tractor controls.
- Mowing blade.
- Throwing distance and direction for that blade.

**Never** allow riders on the equipment.

Remove all litter and debris from the area to be mowed. Stones, tin cans, and wire can be deadly when thrown by a mower blade. Be alert for holes and ditches; these hazards may cause the driver to lose control of the mower.
When using a tractor equipped with a rollover protective structure (ROPS), wear a seat belt. Wear tight and belted clothing that won’t get tangled in moving parts. Wear protective equipment for eyes, hair, hands, hearing, and head. For more information refer to these Tailgate Safety Training modules:

- Personal Eye Protection
- Protective Gloves
- Protecting Against Noise
- Protecting the Head

Before dismounting from the tractor, always disengage the power-take-off (PTO), turn off the engine, and set the brakes. When approaching the mower, make sure that the blades are not rotating. Be aware that the blades will continue to rotate for a while after the power has been shut off.

Be cautious while making turns. If the rear tractor wheel of a pull-type mower catches the mower frame, it could throw the operator. The three-point hitch-mounted mower can swing outward when turning. Adding front wheel weights for balance and control and a wide setting for the rear tires enhances tractor stability and reduces the chance of a tractor overturn. Do not operate on steep slopes. Operate at a safe speed.

Hazard risks increase when equipment is not well maintained. Know the proper maintenance procedures. Check machinery for loose parts and blade sharpness. Replace blades that are too dull to sharpen. Rotary mowers are equipped with runners and safety guards. To avoid excessive wear on the runners, keep the mower just high enough to avoid riding on the runner shoes.

Keep all guards in place and well maintained. The PTO must be shielded. Use chain or belt guards to reduce the possibility of objects being thrown from under the mower.

Manufacturers recommend that children not be allowed to operate a tractor equipped with a rotary mower because of the danger involved. Young workers may be able to operate a sit-down mower of less than 20 horsepower — but only on level ground and with supervision. Under federal child labor regulations, 14- and 15-year-olds may not operate power-driven machinery like rotary lawn and brush mowers.
Safety Tips

- Keep all guards in place.
- Drive cautiously and know the area.
- Always read the owner’s/operator’s manual.
- Keep others away from the area being mowed.
- No riders — driver only.
- Know the child labor laws.
- Wear a seat belt when the tractor is equipped with ROPS.

Review These Important Points

- Know the capabilities of the mower.
- Check for debris, holes, and obstacles prior to mowing.
- Add tractor weights and wider tires if needed.
- Know and follow maintenance procedures.
- Keep all guards in place at all times.
- Know the law when hiring youth to drive mowers.

About These Modules

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Rotary Lawn and Brush Mower Safety

**True or False?**

1. Riders can safely ride on a tractor.  
   T  F

2. There is no need to check the area before mowing.  
   T  F

3. If maintenance is required, guards do not need to be replaced.  
   T  F

4. Always disengage the PTO, turn off the engine, and set the brake before dismounting from the tractor.  
   T  F

5. Knowing the capabilities of the mower is important.  
   T  F
Safe Operation of Portable Circular Power Saws for Trainers and Supervisors

Objective: Use portable circular power saws safely.

Trainer’s Note

Portable circular power saws are powerful but dangerous tools. For this module:

- Discuss the information below on keeping the workplace and saws safe. Present safe work practices.
- Discuss the hazards involved with using power saws and how these hazards can be avoided.
- Hold this session in the shop. Demonstrate safe practices to workers.
- Supervise workers carefully as they practice safe practices.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Portable circular power saws can be used in various landscaping and horticulture tasks:

- Constructing raised garden beds.
- Constructing cold frames.
- Performing greenhouse maintenance or repairs.

Keep the Work Area Safe

- Keep extension cords out of water.
- Keep work area free of clutter and debris.
- Use proper lighting.
- Have adequate ventilation.
What Makes a Saw Safe?

- Sharp blades.
- A three-conductor plug, unless it is double insulated.
- Properly functioning rubber-coated extension cords without cuts, tears, or breaks in the outer coating.
- Properly functioning guards that enclose the portion of the blade above and below the material being cut.

**Portable power saw guards** should be able to move freely and should almost totally enclose the blade except when a cut is being made. Then the guard should rotate to allow the blade to be exposed while making the cut. However, the portion of the blade extending below the material being cut will not be covered by a guard. The depth of the cut should be adjusted to limit the amount of blade extending through the material being cut to 1/2 inch or less.

Follow Safe Work Practices

- Wear eye protection.
- Use appropriate protection when cutting wood treated with chemicals like arsenic — protective gloves, eye protection, or disposable dust mask.
- Replace dull or burned saw blades.
- Lift the saw from the cut after the blade stops.
- Carry the saw by the handle and use the handle to raise or lower the saw.
- Use the correct blade for the material being cut.
- Disconnect power before cleaning the saw, changing blades, or making adjustments.
- Use power hand saws appropriately.
- Place materials on a firm surface for cutting (not on hands, arms, across the knees or feet).
- Cut the materials beyond the end of a support so that the waste falls clear.
- Adjust the blade depth to limit the amount of blade exposed below the material being cut to 1/2 inch or less.

Review These Important Points

- Keep work areas clean and free of clutter.
- Always wear goggles or other eye protection.
- Use the correct blade for the material being cut.
- Carry the saw by the handle and keep fingers off the trigger switch.
- Make sure power saws are grounded with a three-prong conductor plug.
- Replace all damaged parts and cords.
- Make sure guards are in place and functioning.
About These Modules

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Safe Operation of Portable Circular Power Saws

Name____________________________________

True or False?

1. Eye protection is not necessary when using a power saw. T F

2. If an extension cord is damaged, it should be replaced immediately. T F

3. Carry the saw by the handle and not with a finger on the switch trigger. T F

4. One blade can be used for all saw cuts. T F

5. Never use an arm or leg as a sawhorse. T F
Safe Use of Flammable Liquids for Trainers and Supervisors

Objective: Use flammable liquids in a safe manner.

Trainer’s Note

Flammable liquids must be safely handled to prevent fires. For this module:

• Review the information below on storage, fire control, clean up, and disposal.
• Stress the importance of keeping flammables away from any possible sparking.
• Demonstrate storage, clean up, and disposal practices in your own workplace.
• Ask workers to discuss their experiences with handling flammables.
• Review the important points.
• Have workers take the True/False quiz to check their learning.

Background

Many useful liquids are flammable — they can cause a fire. To prevent fires, all flammable liquids must be clearly labeled. Liquids and rags must be stored in the right container. Sparks and smoking must be avoided. You must dispose of spilled liquids or leftovers safely.

Storing Flammable Liquids

Flammables should be stored in a self-closing safety can. Flammables stored in open containers can vaporize. Vapors can ignite or explode if a lighted match or spark is present.

Store gasoline only in a red container. Remember it will ignite if it comes into contact with a hot surface. So, allow any engine to cool before refueling.

Storing Liquid-Soaked Rags

Store liquid-soaked rags in a metal container with a tight-fitting lid. This keeps oxygen away, reducing the chance of a fire. When exposed to air, some rags can produce enough heat to ignite spontaneously. Keep all flammables in a specific storage cabinet, well marked with warning signs.

Fire Control

Control all ignition sources around flammables. Enforce the No Smoking Rule around flammable liquids. Keep sparking tools away from flammables. Use non-sparking electrical equipment around flammables. There must be a fire extinguisher within 75 feet of all bulk transfer stations.
Some materials can ignite from the small energy in a static spark. So, ground and bond all bulk containers during dispensing and pouring. There must be a conductive connection between the receiving container, dispensing container, and a specially installed ground pipe. When drawing liquids from a bulk tank to a portable container, there should be a solid connection between the tank and the container. Self-closing valves on dispensing and pouring containers will minimize spills. Drums stored outdoors in warm weather may require pressure relief venting caps.

**Clean Up and Disposal**

You might spill flammable liquids and other chemicals — solvents, pesticides, nitrate fertilizers, or bleach. Or, you may have leftovers. Spills or leftovers become chemical hazardous waste. Clean up and dispose of hazardous waste according to local, state, and federal regulations. Chemical hazardous waste disposal is expensive. Leftovers can often be used or applied elsewhere. But you must take care to use them before they expire.

**Identification**

Identify flammable liquid containers by a red diamond-shaped label with black lettering.

**Review These Important Points**

- Never store flammables in open or unapproved containers.
- Store flammables in a special storage cabinet that is well marked with warning signs for everyone to see.
- Control all ignition sources around flammable liquids.
- Never smoke around flammable liquids.
- Ground and bond bulk containers because some materials can be ignited by the minimal energy in a static spark.

**About These Modules**

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Safe Use of Flammable Liquids

True or False?

1. Smoking is permitted near flammables.  
2. Keep all sparking tools away from flammables.  
3. Chemicals become hazardous waste when they are spilled or when you no longer have a use for them.  
4. It is important to know and understand the concepts on flammable liquids.  
5. When rags or other materials are used with a flammable liquid, they should be stored in metal containers with tight-fitting lids.
Safe Use of Hand-Held Tools for Trainers and Supervisors

Objective: Use hand-held tools safely.

Trainer’s Note

Workers must understand the proper use of hand-held tools to avoid accidents. For this module:

• Present the information below on different types of tools and safe practices for each.
• Demonstrate the proper use, care, and storage of tools.
• Have each worker identify the hand tools he or she uses on the job.
• Have each worker practice safe methods for using his or her hand tools. Observe workers as they practice. Have practice exercises prepared in advance.
• Review the important points.
• Have workers take the True/False quiz to check their learning.

Background

Wrenches, hammers, pliers. Pruning saws and tools. Crowbars, screwdrivers. Hand hooks, files, and scrapers. Each of these tools might be in your toolbox, and each one needs to be used safely, for the right job.

General Safety Tips

• Personal Protection Equipment can help prevent injuries. For more information, see these Tailgate Safety Training modules:
  ♦ Protective Gloves
  ♦ Personal Eye Protection
  ♦ Protecting the Head

• Stop working if safety glasses become fogged. Clean glasses until lenses are clear.
• Don’t carry sharp or pointed tools in your pocket unless the tool is in a sheath.
• Even better, carry all hand tools in a toolbox or tool belt.

Wrenches

Use the appropriate size and type of wrench for the nut. Is the nut an English or a metric size? Can a closed-end wrench (also called a box-end wrench) be used for a good fit, or is an open-end wrench necessary to reach
the nut? Socket wrenches and ratchets allow turning a nut in a tight location. An adjustable wrench must be used properly; make sure the adjustable jaw faces the operator. Wrenches are manufactured in many sizes with a leverage length appropriate to the size nut to be moved. It is unsafe to use a length of pipe to gain more leverage. Pipe wrenches and locking pliers are not appropriate for use on nuts because a corner of the nut may be broken.

**Hammers**

Use the right type of hammer for the specific job. Never strike hardened steel surfaces with a steel hammer. Use a soft metal hammer or one with a plastic, wood, or rawhide head when striking steel surfaces to align or loosen them. Always wear safety glasses to protect your eyes from small pieces of metal that may fly off the hammer or the object being hit. Inspect all hammers carefully, including large sledgehammers, before use to be sure the head is tight and undamaged. Replace damaged handles; make sure the hammer fits the head properly. Wedge the handle securely in the head and make sure it is free of splinters and cracks.

**Pliers**

Never substitute pliers for another tool such as a wrench to complete the task. It may cause the bolt heads to become chewed. Pliers cannot grip nuts and bolts securely and will slip. If working with electricity, use hand insulated grips. Make sure the protective coverings are free from cracks or holes. Use a vise when cutting wire with the pliers. Hold the open end of the wire with your free hand, foot, or other means to prevent the cutoff piece from flying through the air.

**Screwdrivers**

- Don’t use a screwdriver with wet or greasy hands.
- Don’t use a screwdriver to test a battery charge.
- Don’t use a screwdriver to chisel or pry or punch.
- Pick a screwdriver with the right size and type of head for the screw.
- Make a starting hole for the screw with a nail or a drill.
- Don’t hold the work piece against your body. Steady it on a sturdy flat surface.
- Keep your fingers away from the blade while you’re using a screwdriver.
- Don’t use pliers or a hammer to force the screwdriver.
- For electrical work, use a screwdriver with a blue handle. It is insulated!

**Pruning Equipment**

Use caution when using lopping shears, hand shears, pruning or bow saws, and related pruning tools. Accidents can cause amputated fingers, serious cuts, and significant blood loss.

In particular, use caution when pruning overhead. Limbs or the pruning tool can fall on you, and power lines are a real danger. Contact with a power line can electrocute you. For more information, see the Tailgate Safety Training modules *Electrical Shock* and *Tree Pruning, Trimming, and Felling Safety*.

When storing pruning tools, always keep them locked up in the sheaths provided or in other protective housing units to avoid injury to handlers.

**Saws**

- Don’t use any saw with a dull blade.
- Some saws have adjustable blades — hacksaw, coping saw, keyhole saw, or bow saw. Make sure the blade is taut before using it.
- Keep the saw under control. At the end of the stroke, let up on downward pressure.
• Hold the work piece firmly against your work surface.
• Keep fingers and hands away from the blade while sawing.
• Oil the blade after you use a saw.
• Don’t carry a saw by the blade.

Chisels
• Always use a sharp chisel — not one with a dull cutting blade.
• If the head of the handle is mushroomed, do not use it.
• If possible, hold a chisel with a holder, not your hand.
• Always chisel away from your body.
• Clamp any small work piece in a vise. Chisel toward the stationary jaw.

Other Tools
• Always use each tool for the specific job intended.
• Crowbars should be used only for jobs that require prying.
• Files must be cleaned with a file card after use. Do not strike the file against another piece of metal.
• Hand hooks must be kept sharp to prevent slipping when in use. They should be stored with the point in cork to reduce accidents.
• Scrapers must be kept in good, sharp condition for best results.

Review These Important Points
• Use the right tool for the job.
• Always wear safety glasses/goggles to prevent serious eye damage. For more information, see the Tailgate Safety Training module Personal Eye Protection.
• It is unsafe to add more leverage to any tool by use of an extension.
• Use the shop vise when the job requires.

About These Modules
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Safe Use of Hand-Held Tools

Name __________________________________________

True or False?

1. Keeping hand-held tools in good condition can reduce job-related accidents. T F

2. It is important to wear the proper eye protection when working with hand-held tools to prevent possible eye damage. T F

3. Using the right tool for the intended job will make the task go quicker and safer. T F

4. Crowbars should be substituted for hammers if one is not available. T F

5. Storing all tools in a tool holder or on the tool rack helps keep blades and points sharp. T F
Safe Use of Hand Pallet Trucks and Electric Carts for Trainers and Supervisors

Objective: Use hand pallet trucks and electric carts safely in the workplace.

**Trainer’s Note**

Hand pallet trucks and electric carts make moving materials easy. But they need to be used safely to avoid injuries. For this module:

- Review the information below on how to use hand pallet trucks safely.
- Lead a discussion to help workers apply the information to your workplace.
- Briefly review the operating instructions for hand pallet trucks with the group. Ask an experienced worker to demonstrate working with a hand pallet truck.
- Discuss hand pallet truck accidents and prevention strategies. Use incidents and past accidents to stress the importance of safe operation.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Moving materials with a hand pallet truck or electric cart may seem easy, but safe handling requires skill.

- Raise the forks by pushing the actuating lever down and pumping the handle. This is the only time the handle should be down — to jack the pallet. A 1-inch clearance between the floor and the pallet is usually sufficient.
- Put the actuating lever in a neutral or middle position to move the load. This position disengages the lifting mechanism and frees the handle from hydraulic resistance, but keeps the forks raised. When the lever is released, it will automatically return to the neutral position.

**For Safe Operation**

- Pay attention to maximum load limits. Never overload.
- Check brakes, steering, controls, forks, hoists, and warning devices. Report any problems to your supervisor.
• Watch for water, oil, or other liquids on the floor. Report any wet surface to your supervisor.
• If possible, avoid moving loads up or down ramps.
• Keep the load uphill when going up or down any incline.
• Keep the forks about 4 to 6 inches above the ground.
• Do not turn the handle too fast. This can cause the load to shift.
• Watch for clearances on both sides of the aisle.
• Do not carry riders on the hand pallet truck.
• Center the forks evenly under the load to maintain good balance.
• Ensure the stability of the load.
• Use both forks for lifting a load.
• Pull rather than push loads for increased maneuverability.
• Maneuvering loads using the neutral position reduces operator fatigue.
• Operate at controllable speeds. Hand pallet trucks do not have brakes.
• Allow plenty of room to stop.
• Be aware of other people and forklifts in or near your work area.
• Always be alert on loading docks. Stay away from the edge of the dock.
• If you are loading or unloading a truck at a dock, enter or exit the truck squarely.
• Park the pallet truck out of traffic areas in a safe, level place with the forks lowered.
• The handle should be left in the up position to eliminate tripping hazards.

Review These Important Points

• Maneuvering loads in the neutral position reduces operator fatigue.
• Keep pallet trucks or electric carts out of traffic areas when forks are lowered.
• Never use one fork to lift a load.
• No riders on the pallet truck or electric cart.

About These Modules

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Safe Use of Hand Pallet Trucks and Electric Carts

Name____________________________________

True or False?

1. Push the load. T F

2. Carry as much as the hand pallet truck will hold. T F

3. Pallet trucks do not have brakes. T F

4. A clearance of one inch between the floor and the pallet is usually sufficient. T F

5. Operate the hand pallet truck at a safe speed to avoid accidents. T F
Safe Use of Hydraulic Systems for Trainers and Supervisors

Objective: Describe the hazards in working with hydraulic equipment and how to prevent them.

**Trainer's Note**

Many implements use a hydraulic system. Understanding the system makes accidents less likely. For this module:

- Review the information presented below on hydraulic systems.
- Review hazards of working with hydraulic systems and how to prevent them.
- Ask an experienced worker to demonstrate hooking up machinery to the hydraulic system on a tractor.
- Have other workers practice hook-up while you supervise closely.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Hydraulic systems can be dangerous. Fluid can escape when adjusting or removing equipment. Fluid can be trapped in the hydraulic system even when the engine and hydraulic pump are stopped. An implement in the raised position has trapped hydraulic fluid that might be pressurized — even if it is disconnected.

The pressure of trapped fluid can be more than 2,000 pounds per square inch (psi). Pressurized fluid can penetrate the skin. You would need surgery to remove the fluid. Penetration injuries may not appear serious. But if they are not properly cared for, gangrene may result. So you could lose a body part if you don’t get prompt medical attention.

Tighten all connectors before applying pressure. Cracked hoses may have pinhole leaks. Keep hands and body away from leaks and nozzles that might eject fluid under high pressure. Use a piece of cardboard or paper to search for leaks. Relieve pressure before disconnecting a hydraulic line.

Do not cross hydraulic lines. If the lines are not coupled correctly, the implement will not rise and drop as expected. Tape or color-code lines to prevent an accident.

Heat causes the fluid to expand, increasing the pressure. Always relieve hydraulic pressure before loosening hydraulic fittings. The hot, high-pressure spray of the hydraulic fluid can cause injury.
Before Servicing Hydraulic-Powered or -Controlled Equipment

• Shut off the engine.
• Engage the brake.
• Shut off the hydraulic pump power.
• Lower the implement to the ground.
• Move the hydraulic control lever back and forth several times to relieve pressure.
• Follow the instructions in the operator’s manual. Specific procedures for servicing hydraulic systems provide safety guidelines.
• Stay away from cracked hoses, leaks, and nozzles that might eject fluid under pressure.
• Promptly seek medical attention if fluid is injected into the skin.

Review These Important Points

• Adjusting and removing equipment when hydraulic fluid is under pressure can be hazardous.
• Keep all body parts away from cracked hoses, leaks, and nozzles that might eject fluid under pressure.
• Never cross hydraulic lines on equipment.
• Always lower the implement to the ground and relieve pressure before servicing.
• Follow all instructions in the operator’s manual.
• If you notice a lock or a hose in bad condition, tell your employer to have it replaced.

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Safe Use of Hydraulic Systems

Name____________________________________

True or False?

1. Escaping pressurized hydraulic fluid is not a safety concern. T F

2. Keep body parts away from cracked hoses, leaks, and nozzles that might eject fluid under pressure. T F

3. It is possible to cross hydraulic lines and have the system work correctly. T F

4. If hydraulic fluid is injected into the skin, wash the area immediately and return to work. T F

5. Trapped hydraulic fluid can be pressurized to 2,000 psi or more. T F
Safe Use of Jacks for Trainers and Supervisors

Objective: Use jacks safely for equipment repairs.

**Trainer's Note**

Serious crushing accidents can result from the improper use of jacks. For this module:

- Review the information below on hazards and safe practices with jacks.
- Emphasize the importance of not working alone when using jacks.
- Demonstrate the correct way to use a jack when working on equipment.
- Supervise teams of workers carefully while they practice safe methods for using a jack with various pieces of equipment.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

The recommendations presented here are important for the safe use of jacks. Compare the rated capacity of the jack to the weight of the load to be lifted to ensure that the jack can safely do the job. Keep jacks lubricated as recommended. Do not use a jack that is leaking fluid.

Don’t let this happen!
Reset the jack if it starts to lean and block the equipment more securely.
Handle jacks carefully. Dropping or throwing them may distort or crack the metal, and the jack may fail under the load. Position the jack properly at a point that can support the lifted weight.

The lift point should be flat and level with the floor or the ground. The floor or ground must be able to support the base of the jack. Lift should be straight up and down. If working on the ground outdoors, place a long wide block under the base of the jack to keep it from sinking, shifting, or tipping when weight is applied. If the jack will not lift high enough, place additional blocking under the jack. Never put extenders for height between the jack engagement and the load.

Stabilize the equipment. If the machine is self-propelled, place the transmission in gear or in the park position. Then set the brakes and switch the ignition off. Block at least one of the wheels remaining on the ground. Be certain to loosen the wheel’s nuts before the wheel is lifted off the ground. This will prevent any possible movement that could dislodge the tractor off the jack. When lifting pull-type equipment, hitch it to a tractor drawbar to keep it in place.

Always check the position of the jack after it has started to lift. If it leans, lower the jack and reset. Lift no higher than is necessary. Beware of the jack handle. Some mechanically operated jacks can pop up and kick when the load is lifted or lowered. Stand to one side while jacking equipment to avoid being struck by the handle. Never straddle a jack handle and always remove the handle when it is not being used.

Support the load that is being jacked with blocks or stands. Never allow raised equipment to remain supported by jacks alone. Jacks can fail and tip, causing the equipment to fall unexpectedly. Place solid blocks or stands under the equipment immediately. Do not use cement or cinder blocks because they may shatter under the load.

**When Using Jacks**

- Never work alone.
- Stabilize the equipment, then set the brakes and block the wheels.
- Do not overload the jack. Check allowable load ratings.
- Lubricate with recommended oil as directed.
- Do not drop the jack.
- Discard damaged jacks.
- Position the jack properly and stop lifting if the load shifts.
- Avoid jacking more than one wheel off the ground at a time when working in the field.
- If working on the ground outdoors, place a heavy block under the base of the jack.
- Recheck the jack before completing the lift.
- Remove the jack handle when the lift is completed.
- Lift only as high as necessary.
- Support the lifted load with blocks or a stand.
- Never position any part of your body underneath a jack-raised vehicle.

**Review These Important Points**

- Check the jack rating before use to ensure that it can carry the load.
- Do not use leaking jacks.
- Stand to the side while jacking to avoid being struck by the handle.
• Support the load with blocks or stands.
• Cement or cinder blocks should not be used because they may shatter under the load.

About These Modules

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Keith L. Smith, Associate Vice President for Agricultural Administration and Director, Ohio State University Extension
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Safe Use of Jacks

True or False?

1. Dropping and throwing jacks may distort or crack the metals, causing the jack to fail under the load.   T  F

2. Always place the vehicle in park and set the brakes before jacking.   T  F

3. Do not check or adjust the jack position once it has started to lift the weight.   T  F

4. Support the load that is being jacked with blocks or stands.   T  F

5. A cement or cinder block should be used to block and support the machinery during the lift.   T  F
Safe Use of the Power-Take-Off (PTO) for Trainers and Supervisors

Objective: Use the power-take-off (PTO) safely.

Trainer’s Note

Power-take-offs (PTOs) are used on various machines and lawn equipment. PTOs can be dangerous and must be used safely. For this module:

- Review the information below on PTOs, the hazards they present, and safe practices.
- Demonstrate how to hook up and unhook a PTO properly.
- Wear close-fitting clothing to reinforce the idea that loose clothing is dangerous.
- Supervise workers carefully as they practice hooking up and unhooking a PTO.
- Discuss the importance of keeping protective shields in place.
- Ask workers for examples of possible accidents and preventive measures that should be taken.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Note: Wear close-fitting clothing. Have workers wear close-fitting clothing for this session.

Background

Most power shafts can be extended from the power source to another piece of equipment. This connection is called a power-take-off (PTO). The power source is whatever the PTO is connected to — a tractor, an all-terrain vehicle (ATV), lawnmower, or other equipment.

Power shafts are usually constructed with a square shaft inserted into a housing or casing. It is important that at least 5-1/2 inches of the sliding shaft remain in the housing when the power shaft is connected to the power source. This reduces the possibility of the shafts separating while the equipment is in motion. If the shaft splits, the portion of the shaft connected to the power source is free to whirl at high speeds, endangering the worker and equipment.

People cannot react fast enough to pull away from a spinning shaft, and most clothing is strong enough to pull a person into the spinning shaft. Very serious injury and, more frequently, death is the end result of these accidents.
PTO Safety Guidelines

Before you start the power source, be sure the PTO is disengaged. If the PTO is already engaged when you start the power source, the equipment powered by the PTO will begin to operate.

Use extreme caution when operating equipment with a separable PTO shaft. Never hook 540-rpm (revolutions per minute) equipment to a 1,000-rpm PTO or vice versa.

If the shaft does separate, disengage the PTO immediately and stop the power unit.

Keep safety shields securely fastened on the equipment. Periodic inspections and maintenance of the shields/guards may be necessary. Safe operation of the PTO is not possible without these shields in place. A sudden slip or fall could throw a worker directly onto the unshielded rotation shaft. Also, those who are unfamiliar with the equipment may not recognize the danger of the power shaft.

Wear snug-fitting clothes when working around power shafts. Loose clothing can catch in or be wrapped around the power shaft. Do not step over an operating PTO. A sudden slip or a loose shoestring could cause the worker to become entangled in the PTO shaft. Long hair may also become entangled in a PTO shaft. Hair should be pulled back out of the way and secured. Also avoid any type of jewelry that could become entangled, causing dismemberment or bodily injury.
Review These Important Points

- Keep all PTO guards and shields in place, even when the PTO is not operating.
- Always disconnect the PTO when not in use.
- Never engage the PTO while the machine engine is shut off.
- Keep hands, feet, clothing, and long hair away from the PTO.
- Never operate PTO shafts at extreme angles.
- Be sure that the PTO spinner shields rotate freely at all times.
- Always disengage all power and shut off equipment before servicing.

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Safe Use of the Power-Take-Off (PTO)

True or False?

1. Always disconnect the PTO when it is not in use.  T   F
2. Wear loose fitting clothing when working with PTOs.  T   F
3. Always keep the PTO safety shields on the machine.  T   F
4. Never hook 540-rpm equipment to a 1,000-rpm PTO or vice versa.  T   F
5. Never engage the PTO while the machine engine is shut off.  T   F
Safe Use of Tractors and Self-Propelled Equipment for Trainers and Supervisors

Objective: Use safe procedures to operate tractors and self-propelled equipment.

Trainer’s Note

Safety is critical in operating tractors and self-propelled equipment. For this module:

- Review the information below on safe operation of tractors and self-propelled equipment.
- Have workers practice safe operation. Monitor worker practice yourself or have an experienced worker do so. Provide feedback during practice to ensure that workers understand safe operation.
- Have workers discuss their experiences practicing safe operation.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Note: It is acceptable for a trainer to ride on the tractor with a worker during training only.

Background

Many workers in the green industry use tractors on the job. In addition, workers might use other self-propelled equipment:

- Traveling or watering booms
- Conveyors
- Shipping carts
- Bench transports
- Golf carts
- Utility vehicles

General Safety Guidelines

Read and follow the operator’s safety manual. Keep safety signs in good repair. Replace them as needed. When a part is replaced, transfer the safety equipment to the new part. Replacement safety signs can be bought from a dealer.
Describe how to operate all controls on the equipment. Keep the equipment in good working condition. Do not modify equipment. Do not modify the safety devices. Unauthorized modification can impair the operation and safety of the equipment.

Tractors are powerful machines. They require careful attention to operate and service. New tractors are equipped with safety devices. These devices provide a reasonable amount of protection. Practice good safety habits. Be aware of hazardous situations.

Safe Operation of Equipment

- Safe operation depends on alert and efficient handling. Most accidents occur when the driver is tired or not alert.
- Only trained workers should operate tractors and self-propelled equipment.
- Wear safety glasses to prevent eye damage due to flying debris. Wear snug-fitting clothing. This lessens the chance of clothing catching on a moving part.
- Do not ride double unless a seat is provided.
- Before you start, check the work area for debris, obstacles, ditches, and holes. They could cause the tractor to overturn.
- Be aware of weather conditions. Control is more difficult in mud, snow, or ice.
- The tractor should be equipped with a rollover protective structure (ROPS). This device will protect the driver in case of an overturn. Fasten the seat belt only if there is a ROPS. (For more details, refer to the Tailgate Safety Training module Rollovers and Rollover Protective Structures (ROPS).)
- A first aid kit should be on or near all major equipment. (For more details, refer to the Tailgate Safety Training module First Aid Kits.)

Machines with mounted equipment need adequate ballast for stability. Hitch loads to the draw bar to prevent turning over backwards when pulling. To avoid overturns, back out of deep ditches, up slopes, and out of mud holes. Slow down and begin turning the wheels before applying the brake. This will help avoid overturns, skidding, and bouncing. Sitting down with the seat belt fastened is always encouraged. It is mandatory when traveling over rough terrain. It lessens the chance of the driver being thrown from the machine.

Review These Important Points

- Stay alert. Recognize and follow safety procedures.
- No riders (except during the training session).
- First aid should be readily available.
- Follow recommended guidelines in difficult terrain and weather conditions.
- Read and follow the operator’s manual.
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Safe Use of Tractors and Self-Propelled Equipment

Name____________________________________

True or False?

1. Workers only need to read the operator’s manual when equipment malfunctions.  T  F

2. When driving self-propelled equipment, wear the seat belt even if there is no ROPS.  T  F

3. The tractor is designed for only one person, the driver.  T  F

4. Always check the work area for debris, ditches, or other obstacles.  T  F

5. Training is not needed to operate self-propelled equipment.  T  F
Safely Starting and Stopping a Tractor for Trainers and Supervisors

Objective: Use safe procedures for starting and stopping a tractor.

**Trainer’s Note**

Tractors are common vehicles in the green industries. For this module:

- Present the information below on safe starting and stopping practices.
- Have an experienced tractor operator demonstrate safe techniques for starting and stopping a tractor. Explain each technique as it is demonstrated.
- Supervise workers carefully as they practice safe starting and stopping practices.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Note:** If necessary, you can ride the tractor as an observer while workers practice. However, stress to workers that a rider is allowed *only for training purposes.*

**Background**

Tractors are common and look easy to operate. However, accidents can happen if safety is not carefully observed.

**Mounting the Tractor**

Before mounting the tractor, make sure guards and shields are in place and in good working condition. Use provided handrails for mounting and dismounting. Adjust the operator’s seat for fit and easy access to controls.
Starting the Tractor

Before starting the engine remember to:

- Place the gearshift lever in Neutral or Park.
- Place all hydraulic controls in neutral.
- Disengage the power-take-off (PTO).
- Apply the brakes.
- Depress the clutch pedal.

Tractors will start in gear if normal starting circuitry is bypassed. Start the engine from the operator’s seat with the transmission in park. Do not start the engine by shorting across starter terminals. Never start the engine while you are standing on the ground.

If jumper cables are needed to start the engine, make sure polarity is correct. Reversed polarity will damage the electrical system. Always connect the positive cable first and then the negative cable. Escaping gas can cause an explosion, so position the ground connection away from the battery. This will help keep sparks away from the battery. Follow the instructions in the tractor operator’s manual. Always wear eye protection when working around batteries.

Stopping the Tractor

Stopping the tractor safely involves more than just applying the brakes and turning off the engine. To avoid accidents:

- Lock the brake pedals together when driving.
- Apply the brakes evenly.
- Disengage the PTO.
- Lower all hydraulically powered equipment to the ground.
- Put the gearshift lever in Park or Neutral and set the brakes.
- Turn the ignition key off and remove it to prevent tampering or accidental starting.

Additional Safety Hints

- Keep a copy of the operator’s manual on the tractor or close by.
- To prevent falls, keep the operator station free of oil, grease, mud, and tools.
- Keep trash away from the exhaust system to prevent a fire.
- Keep tires properly inflated.
- Maintain control lights and gauges.
- Ventilate to avoid asphyxiation when operating tractors indoors.

Review These Important Points

- No riders (except for specific training purposes).
- Never start the engine by shorting across starter terminals.
- When jump-starting an engine, avoid sparks around the battery and wear eye protection.
- Always apply brakes evenly and disengage the PTO before stopping the tractor.
- Lock the brake pedals together when driving.
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Safely Starting and Stopping a Tractor

Name____________________________________

True or False?

1. Never start the engine by shorting across starter terminals. T F

2. If jumper cables are needed to start the engine, avoid sparks around the battery. T F

3. Follow the instructions in the operator’s manual. T F

4. Never start the engine when standing on the ground. T F

5. To stop the tractor just apply the brakes and quickly shut off the engine. T F
Safety Means SMV (Slow-Moving Vehicle) for Trainers and Supervisors

Objective: Use Slow Moving Vehicle (SMV) signs properly.

Trainer’s Note

Slow-moving vehicles on the road display an SMV sign as a warning. For this module:

- Review the information below on SMV signs:
  - When they are required.
  - What requirements they must meet.
  - How they should be mounted and maintained.
- Show workers properly mounted SMV signs in good repair.
- If possible, show unacceptable SMV signs for comparison.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

SMV signs are required by law on self-propelled or towed equipment when traveling on roads at speeds of 25 MPH or less. The sign must be visible for at least 500 feet to the rear. Approved SMV signs have a front label identifying the manufacturer and the American Society of Agricultural Engineers (ASAE) standard.
Properly mounted, the sign is centered two to six feet above the ground. It should point up, perpendicular to the direction of travel. It should be clearly visible day and night to approaching or trailing vehicles.

Traffic studies show that two out of three road accidents involving slow-moving vehicles are rear-end collisions. Ninety percent of these accidents happen during the daylight. The use of the SMV sign reduces accidents and saves lives. Signs in poor condition provide little or no protection in traffic. Keep the sign clean for maximum visibility. Replace damaged or faded signs immediately. A faded sign will not be visible for the required 500 feet. When this occurs, the operator’s life is in danger. The law is also violated. To extend the life of the SMV sign, always cover or keep it out of the sun when not in use.

The bright, fluorescent orange triangle of the SMV sign is visible for more than 1,000 feet. This distance provides motorists time to slow down. At night, approaching headlights illuminate the reflective red border of the SMV sign. This border identifies a slow-moving vehicle.

**Review These Important Points**

- Keep the sign clean to enhance visibility.
- Replace faded or damaged signs.
- Mount the sign point up, centered two to six feet above the ground.
- A slow-moving vehicle travels at 25 MPH or less.

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Safety Means SMV (Slow-Moving Vehicle)

Name____________________________________

True or False?

1. SMV signs must be used on machinery and equipment operating on streets and highways only at 15 MPH or less. T F

2. The sign must be firmly mounted, point down. T F

3. A faded sign has limited daytime visibility. T F

4. An SMV sign must be visible for 1,500 feet. T F

5. When used as designed, the SMV sign can reduce accidents and save lives. T F
Selecting a Respirator for Trainers and Supervisors

Objective: Select a respirator to protect against hazards in the air.

**Trainer's Note**

Respirators protect workers’ lungs from dust, mold, mist, and chemicals. For this module:

- Discuss the information below on different types of hazards and respirators.
- Review your written Respiratory Protection Program with workers.
- Review your normal working activities that require respirators.
- Show workers the different respirators used in your workplace.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Workers are often exposed to hazards in the air:

- Working around heavy dust in warehouses and greenhouses.
- Working around mold.
- Handling or applying pesticides.
- Spraying paint.
- Using solvents or other chemical irritants.
- Working around allergens — any substance to which a worker is allergic.

Respirators protect workers against those hazards. Three types of respirators are used during normal work activities:

- **Particulate respirators** use a filter to trap solid particles like dust or mold. They also filter out liquid particles like paint or pesticide mist. They are sometimes called *N95 respirators*.
- **Gas/vapor respirators** use a cartridge to absorb gases and vapors. They are also called *single cartridge respirators*.
- **Combination respirators** have a filter for particles and a cartridge for gases and vapors. They are also called *dual cartridge respirators*. 
A Self-Contained Breathing Apparatus (SCBA) is not often needed in landscaping and horticultural services. An SCBA provides extreme protection for:

- Fire fighting.
- Atmosphere with less than 19.5 percent oxygen.
- Unknown atmosphere.
- Atmosphere that can cause death.
- Atmosphere from which the worker cannot escape.

**Note:** Disposable dust masks are not recommended. The protection they provide is unknown. They should only be used for nuisance levels of dust, mold, and mist.

**The Respiratory Protection Program**

Your employer should have a written Respiratory Protection Program (RPP). It should describe:

- When a respirator is required.
- Medical evaluations needed.
- How to select a respirator.
- How to use respirators.

Review your employer’s RPP. In particular, look for details on your own normal working activities.

**Material Safety Data Sheets**

Material Safety Data Sheets (MSDSs) also specify respiratory protection. Check MSDSs for details on pesticides and chemicals.

**General Cautions**

- If the hazard appears to be immediately dangerous to life and health (IDLH), leave the area immediately or do not enter. If you must enter, you must use an SCBA.
- Use a full-face respirator if your skin or eyes are irritated. If not, a half-mask respirator is acceptable.
- You must fit-test a respirator each time you use it. You may not be able to use a respirator if you have facial hair, scars, or hollow temples. For more details, see the Tailgate Safety Training module *Respirator Fit.*

**Select a Particulate Respirator**

- Choose a safe level of protection. If you are not sure, choose the safest protection, Type 100 or HEPA:
  - Type 95 = 95 percent efficient; appropriate for most dust, mold, or mist.
  - Type 97 = 97 percent efficient; higher level of protection.
  - Type 100 or HEPA = 99.7 percent efficient; used with highly toxic substances like asbestos, lead, and cadmium.

- Pesticide or paint mists may contain oil particles. If you are not sure, use P or HE filters:
  - N = Not resistant to oil; do not use with oil.
Select a Gas/Vapor Respirator

- Choose the correct color-coded cartridge. If you are not sure, choose Olive Green:
  - White = Acid gas
  - Black = Organic vapors
  - Green = Ammonia gas
  - Yellow = Acid gas and organic vapor
  - Olive Green = Multi-gas combinations

Select a Combination Respirator

- Choose a Type 100 or HEPA filter.
- Choose a color-coded cartridge according to the list above.
- If you are not sure, choose a combination respirator. It protects against particles as well as gases and vapors.

General Cautions

- Change filters:
  - When it becomes hard to breathe or
  - According to the manufacturer’s instructions.
- Change cartridges:
  - When you taste or smell a substance or
  - When your eyes, nose, throat, or lungs become irritated or
  - According to the manufacturer’s instructions.
- After use, you must clean and store respirators carefully.
- For more details, see the Tailgate Safety Training module Properly Cleaning and Storing Respirators.

Review These Important Points

- If things appear to be IDLH (immediately dangerous to life and health), leave the area or do not enter.
- If you’re not sure, choose the safest protection:
  - Combination respirator.
  - Type 100 filter.
  - Olive Green multi-gas cartridge.

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Selecting a Respirator

True or False?

1. Type R filters protect against all hazards. T F
2. SCBAs are required for working around dust and mold. T F
3. Yellow cartridges protect against acid gas and organic vapors. T F
4. Respirators are not required for normal working activities. T F
5. Particulates include both solids and liquids. T F
Skin Irritations Caused by Plants
for Trainers and Supervisors

Objective: Identify plants that can cause skin irritations and ways to avoid skin irritations.

Trainer's Note

Many plants can cause skin irritations, not just poison ivy, poison oak, and poison sumac. For this module:

- Review the information below on types of skin irritations and ways to avoid them.
- Ask workers to describe skin irritations they have experienced.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Many plants can cause skin irritations in humans. Some workers may be more sensitive to certain plants than other workers. Generally, there are five categories — poison plants, allergenic plants (and plant parts), skin irritant plants, stinging plants, and thorn plants.

- **Poison plants** include poison ivy, poison oak, and poison sumac. They all contain a toxin called urishiol. This toxin is present in the sap of the plant. Touching this type of plant can cause skin rashes and blisters. See the Tailgate Safety Training module *Poison Ivy, Poison Oak, and Poison Sumac* for more detail.
- **Allergenic plants** (and plant parts) include, among others, orchids, tulip bulbs, chrysanthemums, and dahlias. They cause allergic reactions in some people. The pollen in these plants can cause hay fever or asthma.
- **Skin irritant plants** include, among others, poinsettias, penciltrees, daffodils, hyacinths, and buttercups. These plants can cause skin irritations.
- **Stinging plants** have nettles. Touching a nettle can cause a toxic reaction. However, the reaction does not last long and has no lasting effect.
- **Thorn plants** include, among others, roses, blackberry and raspberry bushes, and black locust and honey locust trees. Infection can result from an embedded thorn. A scratch can also cause an infection especially if dirt gets into the scratch. See the Tailgate Safety Training module *Thorn Bushes* for more detail.

How to Avoid Skin Irritations

- If you handle plants, wear gloves, a long-sleeve shirt, and long pants. Wear work shoes or boots. Do not wear open-toed shoes or sandals.
• Never burn plants that may be toxic. Toxins can be present in the smoke.
• Learn what problem plants grow in your area and how to identify them.
• If you touch a poisonous plant, obtain treatment immediately. See the Tailgate Safety Training module *Poison Ivy, Poison Sumac, and Poison Oak* for more detail.
• Never eat wild berries or plant leaves.
• After handling plants, always wash your hands and other exposed skin before eating, drinking, smoking, or going to the bathroom.
• Wash your clothes separately in hot water. Clean your shoes with rubbing alcohol and water.
• If you have a severe reaction to a plant, such as a rash or blisters, see a doctor.

### Review These Important Points

- Learn to recognize what problem plants look like, such as dahlias, hyacinths, daffodils, and blackberry bushes.
- Wear proper clothing to lessen the chance of plants touching your skin.
- Always wash your clothing separately in hot water.
- Never eat wild berries or plant leaves.
- Never burn plants that may be toxic. Toxins can be present in the smoke.
- Obtain treatment immediately if you develop a rash or blisters.

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Skin Irritations Caused by Plants

Name _________________________________

True or False?

1. Wash your shoes separately in hot water after handling plants. T F

2. Burning plants can release harmful toxins into the air. T F

3. After handling plants, always wash your hands and other exposed skin before eating, drinking, smoking, or going to the bathroom. T F

4. Eating wild berries is okay if they look ripe. T F

5. Wear short-sleeved shirts so you can spot skin reactions easily. T F
Small-Engine Machine Safety for Trainers and Supervisors

Objective: Operate small-engine machines, such as push mowers, weed trimmers, and leaf blowers, in a safe manner.

Trainer’s Note

Landscaping and horticulture workers may use small-engine machines such as push mowers, weed trimmers, and leaf blowers in the course of their work. For this module:

• Review the contents of this module with your workers.
• Point out the safety devices on each machine. Discuss the importance of leaving all safety devices in place.
• Demonstrate how to operate the machine and how to perform routine maintenance.
• Discuss how injuries might occur and how they can be prevented.
• Discuss the proper type of clothing, eye and ear protection, and shoes to wear while operating the machine.
• Review the important points.
• Have workers take the True/False quiz to check their learning.

Background

You may use small engine machines such as push mowers, weed trimmers, and leaf blowers. You should know how to operate and maintain them in a safe manner. If possible, read the operator’s manual. It will contain detailed information on the safe operation and maintenance of the machine. If your employer does not have a manual, ask if one can be ordered from the manufacturer.

Small Engine Safety

• Always check the oil level before starting the engine. Add oil if necessary. Always use the type of oil that is recommended in the operator’s manual.
• If the engine requires a mixture of oil and gasoline, be sure to use the proper ratio. Refer to the operator’s manual for the correct mixture.
• Never fill the gasoline tank if the engine is hot. Allow it to cool down for several minutes before refueling. Clean up any spilled gasoline before starting the engine.
• Do not smoke while filling the gas tank or operating the machine.
• Store gasoline in an approved, properly labeled container. Use only gasoline approved for the engine.
• Never start the engine in an enclosed space. Always start it in a well-ventilated area. Carbon monoxide or fumes can be dangerous in an enclosed space.
• Never touch the engine muffler while it is hot. The engine muffler can get extremely hot. And it stays hot for some time after the engine is shut off. You could be seriously burned should you accidentally touch it.
• Never perform any kind of adjustment while the engine is running.
• Always disconnect the spark plug before performing maintenance and safety checks on small-engine machines.
• When the machine is not in use, disconnect the spark plug. This safety procedure will lessen the possibility of the machine accidentally starting.
• Allow the machine to cool off before storing in an enclosed space.

**General Safety Tips**

• Always wear personal protection clothing such as safety goggles with shields, earmuffs or earplugs, leather or cotton gloves, long pants, and rubber-soled work boots or shoes. Do not wear tennis shoes, sandals or open-toed shoes.
• Remove any loose debris (trash, tree limbs, rocks, etc.) before you start.
• Make sure the area where you will be working is clear of all other workers or bystanders, especially small children and pets. Check the operator’s manual for proper clearance of flying debris.
• Never operate a machine while under the influence of alcohol, drugs, or medication.
• Never remove any safety guards or shields. They are there for your protection.

**Push Mower Safety**

• Start the mower from a firm stance with both feet in a safe position.
• If the mower has a self-propelled mechanism, make sure it is disengaged before you start the engine. If the self-propelled mechanism is in gear, the mower will start to move once the engine has started.
• Never use an electric mower in wet grass. You could receive an electrical shock.
• Never perform any kind of adjustment while the mower is running. For example, if you want to change the height of the wheels, first turn the engine off and disconnect the spark plug. Then reposition the wheels.
• Always push the mower in a forward direction. Never pull the mower toward you. If you slip, your foot could go under the mower deck resulting in a serious injury.
• If the mower deck should become clogged with grass, stop the mower and turn the engine off before clearing the clog. Never touch any part of the mower while operating it except for the handles and throttles.
• If the mower has an attached grass catcher, stop the engine before detaching the grass catcher. Do not let the grass catcher become too full. A full or over-full catcher adds wear and tear on the engine, and the mower does not cut as well.
• Perform a safety check before and after each time you use the mower. Check and tighten all loose nuts, bolts, and screws. If the mower has a drive belt, check for frayed or worn sections. Replace the belt if necessary.
• Clean the mower after each use, including the underside of the mower deck. Clean the grass catcher, if the mower has one.

**Weed Trimmer Safety and Operator Tips**

• Keep your hands, face, and feet away from any moving parts. Do not touch the trimmer string while it is rotating.
• If the trimmer should become entangled, stop the engine immediately. Then untangle the trimmer line. Check for damage before restarting the engine.
• Do not overreach. Always be properly balanced. Be alert if the area you are trimming is wet or on a slope.
• Perform a safety check before and after each time you use the trimmer. Check and tighten all loose nuts, bolts, and screws.
• Clean the trimmer after each use.
Leaf Blower Safety and Operator Tips

- Keep your hands, face, and feet away from any moving parts.
- If your working area is dusty, wear a dust mask.
- Do not overreach. Always be properly balanced. Be alert if the area you are trimming is wet or on a slope. Use caution while working on steps.
- Never operate an electric blower if the area is wet.
- Make sure the air intake is always free of debris.
- Perform a safety check before and after each time you use the blower. Check and tighten all loose nuts, bolts, and screws.
- Clean the blower after each use.

Review These Important Points

- Always wear proper clothing and eye and ear protection while operating small machines.
- Make sure the area is clear of other people where you will be working.
- Always keep all safety shields in place.
- Never touch moving parts.
- Never operate a machine while under the influence of alcohol, drugs, or medication.
- Perform a safety and maintenance check before and after each time you use the machine.
- Clean the machine after each use.

About These Modules

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Small-Engine Machine Safety

Name_____________________________

True or False?

1. Before you start, inspect the area where you will be working for debris. T  F

2. You can remove a safety shield if it is in your way. T  F

3. Never touch a moving part. T  F

4. You can smoke after you have started the machine. T  F

5. Allow the machine to cool off before storing it in an enclosed space. T  F
Spider Bites for Trainers and Supervisors

Objective: Identify general tips to prevent and treat spider bites.

**Trainer’s Note**

Spiders can be all around landscaping and horticulture work. Spider bites can be a slight nuisance or a serious danger. For this module:

- Review the information below on spiders, bites, and how to prevent bites.
- Ask workers to identify symptoms of spider bites.
- Ask workers to identify areas where they find spiders.
- Review the important points.
- Have workers take the True/False test to check their learning.

Background

Many people are afraid of spiders, but the majority of spiders are harmless to humans. In fact, most spiders are beneficial predators that reduce pest populations such as flies, crickets, and mites in and around yards, gardens, and crops. Spiders normally will not attempt to bite unless accidentally trapped against the skin or grasped. However, some actively guard their egg sacs or young. Most spiders prefer warmer climates and dark, dry places where flies are plentiful.

Only a few spiders like the black widow spider and the brown recluse are dangerous to workers. The black widow is known for the red hourglass marking on its underside. Black widow spider webs are usually built in woodpiles, rubble piles, under stones, in hollow stumps, and in rodent burrows.
Brown recluse spiders are very secretive. They can often be found under rocks, in crevices, or inside boxes or containers. Brown recluses are brown in color. They have three pairs of eyes, one pair in the middle and another pair toward each side of their head. They may have a pattern like a violin on their underside — but not always.

**Symptoms of Spider Bites**

Spider bites can have different symptoms. Most are very mild and need not cause concern:

- Painless bite, not even noticed.
- Slight feeling, like a pinprick, when bitten.
- Slight swelling at the site.

However, other symptoms are more serious:

- Sharp, stinging sensation when bitten.
- Significant swelling at the site.
- Breathing problems.
- Dizziness, with some nausea.
- Swelling of the lips or throat.
- Faintness.
- Confusion.
- Rapid heartbeat.
- Hives.

These serious symptoms call for medical attention — fast. They may indicate a black widow or brown recluse bite, or they may indicate that the worker is allergic to spider bites in general. A cloth dampened with cold water or filled with ice may be applied to the bite while awaiting help.

**Preventing Spider Bites**

- Shake out clothing and shoes before getting dressed.
- Check before working near vines, brush, overgrown grass, and wooded habitats.
- Wear gloves when handling firewood, lumber, and rocks.
- Install yellow or sodium vapor light bulbs outdoors since these attract fewer insects for spiders to feed upon.
- Do not stack wood against a building.
- Remove heavy vegetation and leaf litter around building foundations.

**Review These Important Points**

- Black widow spider webs are usually built in woodpiles, rubble piles, under stones, in hollow stumps, and in rodent burrows.
- Install yellow or sodium vapor light bulbs outdoors since these attract fewer insects for spiders to feed upon.
- Check before working near vines, brush, overgrown grass, and wooded habitats.
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Spider Bites

Name

True or False?

1. The black widow is known for the red hourglass marking on its underside. T F
2. Spiders normally will not attempt to bite unless accidentally trapped against the skin or grasped. T F
3. Remove heavy vegetation and leaf litter around the foundation to prevent spider bites. T F
4. Workers may not even notice spider bites when they occur. T F
5. Spiders never actively guard their egg sacs or young. T F
Stress Management
for Trainers and Supervisors

Objective: Manage stress in the workplace.

**Trainer’s Note**

Learning to manage stress can improve mental and physical health. For this module:

- Review the information below on the warning signs of and ways to manage and reduce stress.
- Ask workers to identify specific stress factors in your workplace.
- Discuss how to eliminate or reduce those stress factors.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Green industry service businesses are stressful occupations. For example, seasonal workloads can vary greatly. Seasonal demands lead to long work hours, and those long hours can be a source of stress. Working outdoors in the weather can also add stress. Heat, cold, humidity, precipitation, and winds can all add to stress. Work delays caused by bad weather can add more stress, especially during peak seasonal workloads.

It is important to know how to manage stress levels and to reduce the effects of unwanted stress. One way to manage stress is to talk to other people. This support might come from family, church members, friends, or other workers. There are also several organized self-help groups that offer emotional support and practical help. Consult a family doctor, mental health professional, or religious leader for additional help.

**Three Ways to Help Manage Stress**

- Know the warning signs of stress and monitor stress levels.
- Manage mental and physical health.
- Change your reaction to stressful events.
Stress Can Be Reduced by Making Lifestyle Changes

- Keep a positive attitude.
- Accept that stress is a part of life.
- Clearly define home and work responsibilities.
- Manage time.
- Set realistic goals.
- Learn to relax. Employees who take mid-morning and afternoon breaks will be able to get more accomplished.
- Eat well-balanced meals.
- Develop an exercise program.

Eat an adequate and nutritious breakfast each day. A nutritious breakfast should include protein plus fresh fruit and vegetables. Hunger can make people less able to cope with stress. High blood pressure and cholesterol levels increase the chances of a stroke and heart attack.

Caffeine (coffee, tea, soft drinks, and some drugs) stimulates the nervous system and can cause nervousness and tension. If you tend to be tense or nervous, reduce your consumption of caffeine. Alcohol and drugs can be addictive and may reduce your ability to cope with stress.

A basic exercise program, in addition to daily work, is likely to lessen stress. Exercise will produce a healthier heart, lungs, and arteries and will elevate your mood and encourage a healthy self-concept. Have a complete medical exam before beginning an exercise program.

Finally, know the warning signs of stress-related problems and seek help.

Early Warning Signs of Stress-Related Problems

- Moodiness
- Withdrawing from responsibility
- Trouble falling asleep
- Poor emotional control
- Severe feelings of helplessness and dependency
- Chronic fatigue and susceptibility to illness
- Marked change in appetite or sex drive

If any of these problems persist, consult a doctor.

Review These Important Points

- Stress can be managed.
- Seek help when a problem is discovered.
- A positive attitude makes a difference.
- Eat a well-balanced diet.
About These Modules

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Stress Management

Name____________________________________

True or False?

1. Eating a well-balanced diet of protein plus fruits and vegetables can help control stress. T F

2. Exercise can help manage stress. T F

3. Setting high goals that are hard to achieve helps reduce stress. T F

4. Stress must be completely eliminated from a worker’s life to be active and productive. T F

5. Seek help for stress management before stress gets out of control. T F
Struck-By Accidents
for Trainers and Supervisors

Objective: Prevent struck-by accidents.

**Trainer’s Note**

Poor housekeeping and messy work areas contribute to struck-by accidents. For this module:

- Explain the information below on potential hazards and how to avoid them.
- Demonstrate the right method to handle materials.
- Ask workers to brainstorm for injuries that could occur as a result of flying or falling objects or moving vehicles.
- Ask workers to brainstorm a specific list of struck-by hazards in your workplace.
- Ask workers to brainstorm ways to eliminate or lessen those hazards.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Struck-by accidents are those where an object hits the worker. These accidents are frequently related to material handling and housekeeping. Poorly stacked material may fall or slide. Objects blocking aisles could cause bumps or tripping. Overhead storage shelves, racks, hangers, aisles, passageways, and doors can be a source of danger. Careless work habits can make hazards worse.

Struck-by accidents can also occur during tree trimming, pruning, and felling. The tree or tree limbs can fall and strike workers on the ground or in the tree. Bent limbs can also strike workers when the limb is released and springs back.

**Potential Struck-By Accident Hazards**

- Tools or loose parts left on window ledges, shelves, cranes, or working platforms.
- Objects leaning against walls, racks, posts, or equipment.
- Inadequate guarding on belts or no side barriers on conveyors traveling from one level to another.
- Unmarked low beams or pipes.
• No screen guard on equipment or poor or incomplete screening to guard against objects flying off the equipment.
• Weak overhead supports or poor stacking of materials.

Eliminate Hazards
• Don’t leave tools or loose parts on window ledges, shelves, cranes, or working platforms. If you see any left loose, report them or remove them.
• Leave guards or screens in place on equipment as it was manufactured.
• Mark low beams, pipes, and ceilings with proper Low Clearance – Caution signs.
• Stack and store objects properly.
• If there is a potential danger from overhead hazards, wear an approved hard hat or bump hat. For more details, refer to the Tailgate Safety Training module Protecting the Head.
• Use falling object protective structures (FOPS) on equipment.
• Be alert and report all hazards.

Aisles and Doors
• Keep aisles and passageways clear and well marked.
• Allow safe aisle and door clearance to prevent getting caught or knocking down material.
• If a door swings out into a hallway, mark the door swing on the floor.
• Never stand in front of a windowless, swinging door.
• Before working near a door, post a warning sign or prop the door open. This is especially important if working from a ladder.
• Do not push a door open rapidly or forcefully. Someone may be on the other side.
• When approaching double doors, follow signs indicating which door to use.

Pay Attention
• Watch where you are going.
• Do not get distracted by conversations.
• Approach a corner or intersection from the center of the hall. Plan to walk to the right, reducing the chance of oncoming collisions.

Review These Important Points
• Wear a hard hat or bump hat if necessary for the job.
• Watch for falling objects or items that block aisles.
• Keep all screens and guards in place.
• Use safe storage and handling procedures.

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Struck-By Accidents

Name____________________________________

True or False?

1. It is acceptable to remove machine guards if they are in the way. T F
2. Objects leaning against walls, racks, posts, or equipment pose no potential hazards. T F
3. Tree trimming is not a source of struck-by accidents. T F
4. Do not leave tools or loose parts on window ledges or other working areas. T F
5. Equipment falling object protective structures (FOPS) help reduce hazards. T F
Objective: Describe the effects of alcohol and drugs on workers and on safety.

**Trainer’s Note**

Drugs and alcohol cause many changes to the body and the mind. They can have a disastrous effect on safety. For this module:

- Review the effects of alcohol and other drugs.
- Discuss the case studies with workers using the Case Study Questions.
- Ask workers to share cases of alcohol and drugs they have seen on the job. Ask workers to discuss those cases using the Case Study Questions.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Drugs and alcohol have many detrimental effects on the body. Those effects can be short-term or long-term. All those effects increase the possibility of accidents on the job.

**Alcohol**

Alcohol, a drug, depresses the central nervous system. With moderate drinking a person may experience:

- Dizziness
- Dulling of senses
- Impaired coordination
- Impaired reflexes
- Impaired memory
- Impaired judgment.

Consumed in large amounts or over a long period of time, alcohol may cause damage to the liver, heart, and pancreas. Heavy binge drinking can depress the parts of the brain that control breathing and heart rate; it can cause death.
Illegal Drugs

Illegal drugs include marijuana, cocaine, crack cocaine, speed (amphetamines), heroin, LSD (lysergic acid diethylamide), PCP (phencyclidine), and many others. They can last for several months in the body. They can cause:

- Decreased long- and short-term memory
- Decreased concentration
- Distorted senses
- Impaired perception of time and space
- Slowed reaction time
- Temporary blindness
- Hallucinations.

Prescription and Over-the-Counter Drugs

Even legal, “safe” drugs can have harmful effects if used improperly. For example, prescription or over-the-counter drugs may cause drowsiness. They may have other harmful effects if:

- They are used in combination with another drug.
- They are used in the wrong dosage.
- Safety precautions are not followed.

Substance Abuse and Job Performance

- Alcohol can affect job performance for up to 14 hours.
- Combining alcohol and other drugs multiplies their effects. That increases the risk of injury and death.
- Drugs and alcohol increase the possibility of accidents.

Case Study 1

Joe drank beer and wine in high school and started using other drugs as a young adult. While working at Miller’s nursery, he started taking speed to get going in the morning. The drugs interfered with Joe’s judgment and caused a series of on-the-job injuries to him and others.

Case Study 2

Molly, a forklift operator, drank alcohol during her lunch hour. During a 16-hour shift, she drank on two more occasions and then went back to work. Molly knew she was high but felt that she could work. Before the shift ended, Molly struck a barrier with the forklift and was thrown from the vehicle. She lost work as a result of the injury.

Case Study Questions

- What was the immediate cause of the incident?
- What are the factors that led to the incident?
- How could similar incidents that could result in illness or injury be prevented?
- How could these situations be prevented?

Review These Important Points

- Alcohol is a drug.
- Even with moderate drinking a person experiences impairments.
- Drugs can last several months in the body.
• Working under the influence of drugs or alcohol can cause a serious accident.
• The effects of alcohol can last up to 14 hours.
• Using both alcohol and drugs increases the problem and can lead to a serious accident.
• If you have a problem, tell someone who can help.
• If a co-worker has a drug or alcohol problem, tell someone who can help.

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Substance Abuse and Accidents

Name____________________________________

True or False?

1. Drinking alcohol will affect job performance. T  F
2. Job performance may be impaired up to 14 hours after drinking alcohol. T  F
3. The combination of drugs and alcohol has little or no effect on working. T  F
4. If a co-worker is affected by drugs or alcohol, it is not a problem. T  F
5. With moderate drinking, a person may experience impairments in coordination, reflexes, judgment, and memory. T  F
Objective: Identify the risks of overexposure to the sun and the means to prevent overexposure.

**Trainer's Note**

Sun exposure is a hazard that landscapers and green industry service personnel cannot avoid. Too much exposure to the sun can cause skin cancer. For this module:

- Review the information below on sun exposure, types of skin cancer, and how to minimize the risk of skin cancer.
- Discuss wearing protective clothing and sunscreen with workers.
- If workers are willing, ask them to share personal experiences with skin cancer.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

For related topics, see the Tailgate Safety Training module *Heat Stress*.

**Background**

Workers in the green industry work long hours, often outside in the sun. During peak season, workers can spend even more hours exposed to the sun. However, too much exposure to the sun can cause skin cancer. About 800,000 new skin cancer cases are diagnosed each year. Proper personal protection must be used to limit skin exposure. Wearing a hat and applying sunscreen reduce the chance of getting skin cancer.

Sun exposure is a key factor in the development of skin cancers. Basal cell and squamous cell skin cancer risk is linked with cumulative sun exposure. Malignant melanoma risk is linked with cumulative sun exposure and the number of severe burns. Some people have greater risk of skin changes and skin cancer from sun exposure:

- People who burn easily, rarely tan, and have freckles.
- People who have a fair complexion.
- People with blonde or red hair.
- People with blue or gray eyes.
Watch for Skin Cancer

You should check any skin spot that spontaneously bleeds, changes color, or changes size. A self-exam guide can help you decide when you should see a doctor. The American Cancer Society has a good self-exam guide. Look for these physical signs:

- Asymmetrical spots.
- Irregular borders.
- Color variations.
- Diameters bigger than the end of a pencil eraser.

If you have any questions about the possibility of skin cancer, consult a doctor.

Skin Cancers

- **Basal cell** cancer look shiny. It usually can be cut away or treated topically. If diagnosed and treated early, it can be cured. It is more of a concern later in life.
- **Squamous cell** cancer looks rusty and warty. It usually can be cut away or treated topically. If it is diagnosed and treated early, it can be cured. It is more of a concern later in life.
- **Melanoma** looks like a dark mole. However, malignant melanoma can be dangerous, even fatal. Melanoma cases have been steadily rising. It affects people of all ages.

To Minimize the Risk of Skin Cancer

- Protective clothing acts as a barrier between the skin and the sun. So, wear long sleeves, long pants, high socks, and gloves. Tighter woven fabrics provide greater protection. Lighter colored clothing reflects heat better.
- Wear a wide brimmed hat, cap flap, or the flap on cap. A baseball cap offers the least protection. Baseball hats do not protect ear tips, temples, or the back of the neck.

- Use a sunscreen with a sun protection factor (SPF) of 15 or more while working outdoors. Reapply the sunscreen every two hours. SPF measures protection from sun exposure, not length of time exposed to the sun.
- Use a sunscreen that provides all-day protection or broad-spectrum sunblock to block both UVA and UVB ultraviolet light.
- If you note skin changes, see a doctor.
- Wear sunglasses to block ultraviolet (UV) rays and protect the eyes from sun exposure. Wraparound lenses offer the best protection. Sunglasses should block at least 99 percent of UV rays. Look for that information on the label.
While working outdoors in the sun, you can get dehydrated. Dehydration can be very serious. Drink one glass of water every 15 to 30 minutes. (For more information, see the Tailgate Safety Training module Heat Stress.)

Review These Important Points

- Skin cancers are the most common cancers experienced in the United States.
- The major cause of skin cancers is the amount of time a person is exposed to the sun.
- Wear protective clothing that serves as a barrier between the sun and the skin.

About These Modules

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Sun Exposure

Name______________________________

True or False?

1. Wear lighter-colored protective clothing as a barrier between the sun and the skin.  
   T  F

2. Use a sunscreen with SPF below 15 if working outdoors.  
   T  F

3. Melanoma only affects older people.  
   T  F

4. Workers in the green industry are continually at risk of developing skin cancer of the head, face, ears, or neck.  
   T  F

5. A self-exam guide is a good substitute for seeing a doctor.  
   T  F
Task Lighting
for Trainers and Supervisors

Objective: Use appropriate lighting for the type of work, the workplace, and workers’ visual capabilities.

Trainer’s Note

Good lighting makes work easier and safer. Poor lighting can make it difficult and dangerous. For this module:

- Review the information on hazards caused by poor task lighting and safe task lighting practices.
- Lead a discussion about the task lighting in your own workplace. Identify hazards and possible remedies.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

General lighting provides light for an entire building or facility. Task lighting, on the other hand, is the lighting available at the work area where a task is performed. Proper task lighting makes work safer and easier. Workers receive about 85 percent of their information through their eyes. Appropriate lighting highlights moving machinery and other safety hazards. That helps prevent accidents from unseen hazards. Good lighting also reduces vision problems and injuries from momentary blindness.

Task Lighting Hazards

Inappropriate lighting, such as using only overhead lights, can create shadows. Shadows can make work difficult and dangerous, hiding sharp edges and other potential hazards. Poor lighting can cause:

- Injuries from unseen hazards.
- Eyestrain.
- Eye irritation.
- Blurred vision.
- Dry burning eyes.
- Headaches.
Task Lighting Safety Practices

- Provide lighting with adjustable intensity to meet the needs of workers with visual limitations.
- Use light colors on walls, ceilings, and floors to reflect light. Keep these surfaces clean.
- Keep workplaces well lighted.
- Replace and clean lights regularly.
- To prevent shadows, light the work area, ceilings, and walls independently.
- Use task lighting when general and local lighting are not sufficient.
- Allow workers enough time for their eyes to adapt from a well-lighted to a low-lighted area and vice versa.
- Use filters to diffuse overhead lighting.
- Diffuse overhead lights.

Review These Important Points

- Workers receive about 85 percent of their information through their eyes.
- Shadows can make work difficult and dangerous, hiding sharp edges and other potential hazards.
- Poor lighting can cause eyestrain, eye irritation, blurred vision, dry burning eyes, and headaches.

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Task Lighting

Name ________________________________________________

True or False?

1. Use light colors on walls, ceilings, and floors to reflect light. Keep these surfaces clean. T F

2. Keep workplaces well lighted and replace and clean lights irregularly. T F

3. To prevent shadows, light the task, ceilings, and walls dependently. T F

4. Use task lighting when general and local lighting are not sufficient. T F

5. Allow enough time for your eyes to adapt from a well-lighted to a low-lighted area and vice versa. T F
Thorn Bushes for Trainers and Supervisors

Objective: Work safely around thorn bushes.

Trainer's Note

Workers may have to work near or with thorn bushes. While thorn bushes are not especially dangerous, they can cause injuries if precautions are not taken. For this module:

- Review the contents of this module with your workers.
- Discuss important points with your workers.
- Ask workers what thorn bushes they encounter in the area.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Many bushes, shrubs, and scrub trees have thorns. Some examples are rose, multiflora rose, blackberry, and raspberry bushes. If you have to work near or with these plants, be aware that the thorns are sharp. Thorns can cause cuts, lacerations, and scratches to your skin.

How to Avoid Contact With Thorns

- Always wear gloves. Leather gloves are best.
- Wear a long-sleeve shirt and long pants. Clothing made of thicker cloth is better.
- Wear work shoes or boots. Do not wear sandals or open-toed shoes.
- If you are cutting bushes, wear eye protection and a safety hard hat.

If Cuts, Lacerations, or Scratches Occur

- Try not to get dirt into the scratch or wound. Dirt can cause an infection.
- Clean the wound with rubbing alcohol.
- Apply iodine or an anti-bacterial ointment.
- If the scratch is deep, apply a band-aid or bandage.
- If infection should occur, see a doctor.
Review These Important Points

- Be aware that thorns are sharp and can scratch or cut your skin.
- Always wear gloves when you handle thorn bushes.
- Clean cuts and scratches with rubbing alcohol and apply iodine or an anti-bacterial ointment.

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Thorn Bushes

Name____________________________________

True or False?

1. It is not necessary to wear gloves when working with thorn bushes. T F
2. If you are cutting bushes, wear eye protection and a safety hard hat. T F
3. Clean cuts with rubbing alcohol. T F
4. Dirt in a wound can cause an infection. T F
5. See a doctor if infection occurs. T F
Tick Bites for Trainers and Supervisors

Objective: Identify general tips to prevent and treat tick bites.

**Trainer's Note**

Ticks can be just pests, but they can also be dangerous. For this module:

- Review the information below on ticks, tick bites, and symptoms.
- Ask workers to identify areas where they have found ticks.
- Review the important points.
- Have workers take the True/False test to check their learning.

**Background**

Working in landscaping, forestry, or brush clearing can be risky because of exposure to ticks. The most frequently encountered ticks are the American dog tick and the ground hog tick. They can be found on various mammals, including ground hogs, raccoons, dogs, and humans. Deer tick and western black-legged ticks are much smaller than common dog and cattle ticks.

When ticks feed on animals, they can acquire diseases including Lyme Disease and Rocky Mountain Spotted Fever. Then, ticks can pass the disease on to humans. Often, emergency help should be sought right away. Workers who are bitten should identify the tick to help doctors diagnose the trouble.
### Lyme Disease Symptoms

- **Bulls-eye rash**
  - Looks like a bulls-eye, with a reddish outer ring and a pale center
  - Warm to the touch
  - Usually more than two inches in diameter
  - Occurs in 75 percent of those infected with Lyme disease.

- **Fever**
- **Lymph node swelling**
- **Neck stiffness**
- **Generalized fatigue**
- **Headaches**
- **Migrating joint aches**
- **Muscle aches**

### Rocky Mountain Spotted Fever Symptoms

- **Initial symptoms may include:**
  - Fever
  - Nausea
  - Vomiting
  - Severe headache
  - Muscle pain
  - Lack of appetite

- **Later signs and symptoms include:**
  - Rash
  - Abdominal pain
  - Joint pain
  - Diarrhea

The three classic symptoms are fever, rash, and history of tick bite.

### Preventing Tick Bites

- Stay out of brushy, overgrown grass, and wooded habitats, especially in spring and early summer.
- Remove leaves, tall grass, and brush from work areas. This will reduce tick, deer, and rodent habitat.
- Apply tick-toxic chemicals to work areas to help control the tick population.
- Wear light-colored clothing so ticks may be more easily seen and removed before attaching.
- Wear long-sleeve shirts. Tuck pant legs into socks or boots.
- Wear high boots or enclosed shoes that cover the entire foot.
- Wear a hat.
- Spray insect repellent on exposed skin, excluding the face.
- Shower and wash and dry clothes at a high temperature after outdoor exposure.
- Check your whole body for ticks, especially armpits, groin, and pubic areas.
- If a tick is found, remove it with tweezers and clean the area with an antiseptic.

### Removing Ticks

A tick usually doesn’t bite until it has been attached to your body for 24 hours. So, if a tick should become attached to you, remove it as soon as possible:

- Use tweezers to pull the tick straight away from the skin.
- Grasp the tick by the head with the tweezers.
- Do not twist or jerk ticks, as mouth parts may be left in the skin.
- Do not use a hot match or cigarette to remove a tick. This may cause the tick to burst.
- Avoid touching ticks with bare hands.
- After removing a tick, carefully disinfect the bite site. Wash hands with soap and water.

### Review These Important Points

- Whenever bitten, try to identify the tick to help doctors diagnose the trouble.
- Lyme disease can cause a bulls-eye rash that is more than two inches in diameter.
- Remove leaves, tall grass, and brush from work areas. This will reduce tick, deer, and rodent habitat.
About These Modules

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Tick Bites

Name____________________________________

True or False?

1. Deer ticks are the most common and frequently encountered. T F
2. Twist or jerk ticks to remove them as soon as they are found. T F
3. Use a hot match or cigarette to remove ticks. T F
4. Wearing long pants and long sleeves outdoors helps prevent Lyme disease. T F
5. Shower and wash and dry clothes at a high temperature after outdoor exposure to prevent tick bites. T F
Tractor Loader Safety for Trainers and Supervisors

Objective: Operate a tractor loader according to safe standards.

**Trainer’s Note**

Tractor loaders move materials easily and quickly. But they do involve some risks. For this module:

- Present information below on tractor loaders, rollovers, and safe practices.
- Have an experienced operator demonstrate equipment and safe practices.
- Supervise workers closely while they practice using the tractor loader safely.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Note:** Do not allow workers to practice on a tractor loader unless they are qualified operators.

**Background**

Tractor loaders are helpful for moving materials from one place to another. However, a fully loaded loader makes the tractor front heavy and could cause an accident. Only install loaders designed specifically for the tractor to reduce the chances of rollover or malfunction.
A raised loader changes the center of gravity of the tractor and can cause the tractor to tip under conditions that would normally be safe. Also, tractor loaders often operate in confined areas that make short turns unavoidable. Both of these factors make loader-equipped tractors susceptible to rollovers.

**To Avoid a Rollover**

- Watch carefully for obstructions and depressions.
- Handle the rig smoothly, avoiding quick starts, stops, and turns.
- Keep the bucket as low as possible when turning and transporting.
- Ballast the tractor loader combination as recommended by the manufacturer. Or, attach wheel weights to the rear axles or wheel rims. Weight may also be carried by a three-point hitch.
- Adjust the width of the tractor as wide as practical or possible.
- Use a front end loader only for its specific purpose. It should not be used for removing fence posts, towing, or knocking something down.

**Other Tractor Loader Safety Tips**

- **No riders** on the tractor!
- Lower loader arms slowly and steadily.
- Keep travel speed slow.
- When turning, adjust for the extra length of the loader.
- Raise the loader in an area free of overhead obstacles, such as overhead power lines.
- Keep the loader low while carrying loads and/or while driving on an incline.
- Use special care when driving over uncompacted soil, which can be unstable.
- Drive loaded buckets uphill rather than downhill, and stay off steep slopes to prevent bouncing and loss of control.
- Back filling (replacing dirt) can cause new construction areas to collapse.
- Watch for falling rocks and cave-ins when undercutting.
- Stay away from the outer edge of banks and slopes.
- Load the bucket evenly from side to side and keep within the normal capacity of the tractor and loader.
- Use the recommended amount of ballast to give the tractor extra stability.
- Never tow a tractor by attaching a tow chain or cable to the loader.
• Never allow people to ride in the bucket.
• A load should not be moved or swung with people in the work area.
• Operate controls only when seated on the tractor.
• Remove the loader from the tractor when the loader is not in use.
• Physically block the bucket and/or arm if they have to be raised for maintenance.
• Never walk or work under a raised loader.
• Put the loader on the ground, turn off the engine/electric power, then dismount.
• Be sure the tractor has back-up alarms in case the driver’s view to the rear is blocked.

Bale Handling Tips

• Round bales should not be handled without the attachments recommended by the manufacturer, such as bale forks, spears, grapples, or huggers.
• Do not exceed the weight limitations of the loader when moving heavy loads — sod pallets, containers, pavers, wall material, and soil, for example.
• Carry the bale slowly and as low as possible to the ground.
• When handling round bales on a slope, always approach the bale with the tractor facing uphill.
• Never use the tractor loader to stop a rolling bale.

Review These Important Points

• Tractor loaders can be dangerous because they affect a tractor's center of gravity.
• Keep travel speeds slow.
• Operate controls only when seated on the tractor.
• Watch out for others when working with a loader.
• Ballast and adjust the tractor for the load to prevent accidental rollovers.

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Tractor Loader Safety

Name____________________________________

True or False?

1. The bucket should be kept as low as possible when turning and transporting. T F
2. Stay away from the outer edge when working along high banks and slopes. T F
3. Never walk or work under a raised loader. T F
4. Drive loaded tractors with the bucket pointing downhill rather than uphill. T F
5. Raised loaders can be dangerous because the center of gravity is changed. T F
Tractors, Towed Equipment, and Highway Safety for Trainers and Supervisors

Objective: Use safe highway procedures for tractors and towed equipment.

Trainer’s Note

Accidents occur because highway safety precautions are not followed. But you have to travel between job sites on the highway. For this module:

- Discuss procedures for traveling on highways with tractors or towed equipment like wagons, grinders, and trailers.
- Emphasize common sense and good judgment.
- Discuss driving safely on highways.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

For more information on slow moving vehicle emblems, refer to the Tailgate Safety Training module Safety Means SMV (Slow Moving Vehicle).

Background

Sometimes you need to move a tractor, lawn mower, or landscaping equipment for some distance. If so, it is best to haul it on a truck or a trailer.

Use Safe Highway Procedures for Hauling

- Haul tractors and equipment on a flatbed trailer.
- Lock the brake pedals on any equipment you are hauling.
- Tie down all equipment hauled on a trailer.
- Obey the laws for height and width regulation.
- It is illegal to travel faster than 25 miles per hour (mph) with an SMV emblem. So remove, cover, or turn the SMV emblem when equipment is transported on another vehicle.
- Use the correct flags, lights, and reflectors on the transport vehicle to warn other drivers.
- Lock brake pedals.
Driving on Public Roads

For shorter distances, highway travel is appropriate. You might drive a tractor, pick-up, or other truck. You might tow wagons for debris, grinders, or equipment on trailers. For everyone’s safety on the road, some safety provisions should be followed. Only operate machinery in good repair on the highway. Properly hitch implements with adequate safety chains before beginning the journey. Do not use makeshift hitch pins.

Before You Drive on Public Roads, Remember These Tips

• Adjust mirrors for good vision.
• Make sure that all warning flashers, lights, and SMV emblems are in proper operating condition. They should be clean and easily visible for 500 feet.
• Put an SMV emblem on towed equipment if the equipment hides the SMV emblem on the tractor.
• Check tire pressures. Inflate the tires to the maximum recommended pressure for long-distance travel.
• Check the wheels to see if the lug nuts are tight.
• Make sure the tractor and equipment are balanced properly.

When pulling onto a public road, use a wide shoulder if available. If the shoulder is not wide enough, stay on the road. Allow extra time to reach full speed. Tractors do not accelerate rapidly, especially when towing equipment.

When Driving on Public Roads, Remember These Tips

• Watch for potholes or obstacles that could tip the vehicle.
• Listen for cars. Often vehicles will approach rapidly from the rear at three to four times the speed of the tractor.
• Stay alert at all times to avoid a serious accident.
• Keep a constant lookout for pedestrians, animals, and road obstacles.
• Slow down for sharp curves.
• Slow down when going down a hill.
• Be sure the vehicle has proper lighting and an SMV emblem when traveling at dusk or at night.

SMV Emblems and Lighting

Vehicles traveling on public roads at 25 mph or less are legally required to have an SMV sign. SMV emblems must be visible for at least 500 feet to the rear. For more information, refer to the Tailgate Safety Training module Safety Means SMV (Slow Moving Vehicle).

Lighting regulations for SMVs vary. Before installing any warning light system on a tractor, check the regulations. Generally, the lighting and marking laws for tractors or self-propelled machines are consistent with recommendations by the American Society of Agricultural Engineers (ASAE) or the Society of Automotive Engineers (SAE):

• Two headlights
• At least one tail lamp, mounted on the left side facing the rear of the tractor
• At least two amber warning lights, visible from front and rear, mounted at the same level at least 42 inches above ground level
• At least two red reflectors, visible from the rear and mounted on either side

Only one vehicle classified as machinery may be towed by the licensed motor vehicle.
Lights and emblems must be clearly visible. If lights or emblems are blocked during towing, attach lights and emblems to the rear of the implements. Most tractors can be equipped with auxiliary connectors; those allow implement electrical systems to be plugged into the circuit operating the tractor lights.

**Review These Important Points**

- Most state laws define an SMV as traveling at 25 mph or less.
- Know the law concerning highway travel for tractors.
- Watch for highway traffic.
- Use common sense and obey traffic patterns when traveling on the highway with a tractor.

**About These Modules**

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Tractors, Towed Equipment, and Highway Safety

Name____________________________________

True or False?

1. When tractors or equipment must be transported long distances, it is safest to haul them on a flatbed.  T   F
2. Stay alert at all times to avoid a serious accident.  T   F
3. There is no need to use an SMV sign if traveling only five miles.  T   F
4. Slow the tractor speed down when going through a sharp curve or down a hill.  T   F
5. Make sure that all lights and warning signals are in working order before traveling on the road.  T   F
Tree Pruning and Ladder Safety for Trainers and Supervisors

Objective: Use safe procedures for tripod, closed top, extension, and straight ladders.

**Trainer’s Note**

Workers can use different kinds of ladders to prune and trim trees. Each type of ladder requires safe practices. For this module:

- Present the information below on safe practices for tripod, closed top, extension, and straight ladders.
- Demonstrate how to use a tripod, closed top, extension, and straight ladder.
- Supervise workers as they practice using the different types. Reinforce the proper way to use the ladders.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Background**

Before workers begin working from ladders to prune trees, they should be properly trained. Landscape maintenance crews should include an experienced person to simplify and expedite ladder moving. Moving ladders can cause extra work and may lead to additional accidents.
Tripod Ladders

Tripod ladders are designed for soft and uneven terrain. With three legs, they offer the greatest stability. They lack spreaders, locking devices, steel points, and safety shoes. The top of the ladder can be made of a combination of wood or metal. Tripod ladders have these features:

- Single back leg provides relatively stable support on uneven terrain.
- Steps are at least 27 inches long and should have a metal angle brace.
- Maximum flare on the top to bottom rails (averaging 2-1/4 inches per foot) is required to stabilize the base.
- A wide foot on the rails is provided to control excessive penetration in soft soil.

Improper setup and use of tripod ladders leads to many accidents, including falls:

- The top of a ladder is not a step and should never be used as a step.
- Only one person should be on the ladder at a time.
- This ladder is not a general-purpose ladder and should only be used by a landscape maintenance crew for pruning operations.
- The back of a tripod ladder should be towards the center of the tree or shrub, allowing for additional support if the worker slips.

Closed Top Ladders

A closed-top ladder has two rails that come together at the top. This closed top makes for an easy fit into a tree limb crotch. The closed top also increases stability. Workers should be sure that the closed top fits securely into the tree limb crotch.

Step Ladder

- Be sure the spreader is locked before you climb on the ladder.
- Never stand on the top or the top step of a stepladder.

Extension and Straight Ladders

- Extension and straight ladders can be safe for tree pruning with optional equipment:
  - Steel spikes to keep the base from slipping/skidding.
  - Rubber sleeves on the upper rail sector to reduce branch abrasion and the possibility of slippage along the tree limb.
- Make sure the base of the ladder is level and firmly placed on the ground. Use the four-to-one rule for proper positioning. For details on the four-to-one rule, see the Tailgate Safety Training module Proper Use of Ladders.
- Secure the top of the ladder to the tree so it allows access above the branch being cut. Allow for any upward movement of the branch once the branch is cut.
- Never stand on the top three rungs of an extension or straight ladder.
- Always face the ladder and hold onto the side rails with both hands when going up or down.
- Use a safety rope to raise and lower tools.
- Keep your body centered between the rails of the ladder while working.
- Never use a ladder in a strong wind.
- Consider using a full-body harness or safety belt.
Overhead Electrical Hazards

- Check for overhead power lines!
- Stay at least 10 feet away from power lines.
- If you work near electrical power lines, always use a wooden or fiberglass ladder. Never use a metal ladder around power lines.
- See the Tailgate Safety Training module Overhead Electrical Hazards.

Review These Important Points

- Tripod ladders are a source of accidents.
- The top of the ladder is not a step.
- The back of a tripod ladder should be aimed toward the tree or shrub center.
- Everyone using a ladder should have proper training before work begins.

About These Modules

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</table>
Tree Pruning and Ladder Safety

Name______________________________

True or False?

1. Never stand on the top step of a ladder. T  F

2. Everyone using a ladder should have training. T  F

3. Moving the ladders as little as possible will save time and prevent accidents. T  F

4. Landscape maintenance teams should include an experienced person to simplify and expedite ladder moving. T  F

5. Tripod ladders can be used as a general-purpose ladder. T  F
Objective: Identify the risks in tree pruning, trimming, and felling and how to avoid them.

**Trainer’s Note**

Pruning, trimming, and felling trees all involve serious hazards. For this module:

- Review the information below on hazards and safety practices in pruning, trimming, and felling trees.
- Ask workers to give examples of risks in tree pruning, trimming, and felling.
- Review the important points.
- Have workers take the True/False test to check their learning.

**Background**

Pruning, trimming, and felling trees are risky because:

- Workers can fall.
- Workers can come into contact with overhead power lines.
- Workers are using loud and dangerous tools like chain saws.
- Falling limbs or trees can strike workers or by-standers on the ground.

Many hazards involved in pruning, trimming, and felling are covered in detail in other Tailgate Safety Training modules.

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Tailgate Safety Training Module</th>
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<tbody>
<tr>
<td>Falling</td>
<td>Preventing Falls From Trees</td>
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<td></td>
<td>Tree Pruning and Ladder Safety</td>
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<td>Bucket Trucks and Aerial Lifts</td>
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<tr>
<td>Electrocution</td>
<td>Overhead Electrical Hazards</td>
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<tr>
<td>Being cut by chain saws or trimmers</td>
<td>Chain Saw Safety</td>
</tr>
<tr>
<td>Loud, continued noise from equipment like chain saws</td>
<td>Protecting Against Noise</td>
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<tr>
<td>Being struck by falling branches or trees</td>
<td>Struck-By Accidents</td>
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<td>Protecting the Head</td>
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</tbody>
</table>
Tree climbing using rope systems can be more risky than working from a bucket truck or aerial lift due to:
- Unstable work position.
- Weakness of ropes to damage from equipment such as chain saws.
- Physical fatigue from using ropes.

**General Safety Tips for Tree Pruning, Trimming, and Felling**

- **Check for overhead power lines!**
- Inform co-workers and neighbors in the vicinity.
- If a ladder is used, tie it to the tree and use a ladder to have access above the branch.
- Use a fall-arrest harness attached to a secure part of the tree.
- Use warning signs around the work site to prevent public access.
- Use control lines on trees, to direct their fall in the intended direction.
- When felling, keep a distance of at least twice the length of the tree between the tree and people.
- Have a co-worker assist in controlling movement of falling branches.
- Stay at least 10 feet away from power lines.
- Use an observer to watch out for power lines.
- Safety observer should wear protective clothing.
- All workers and observers should wear hard hat, goggles, hearing protection, fluorescent vest, cut-resistant trousers, and safety boots.

**Review These Important Points**

- Use warning signs and barricades around the work site to prevent public access.
- Wear hard hat, goggles, hearing protection, fluorescent vest, cut-resistant trousers, and safety boots.
- Have a co-worker assist in controlling movement of falling branches.
- Use an observer to watch out for power lines.

**About These Modules**

The author team for the training modules in the landscape and horticultural tailgate training series includes Dee Jepsen, Program Director, Agricultural Safety and Health, Ohio State University Extension; Michael Wonacott, Research Specialist, Vocational Education; Peter Ling, Greenhouse Specialist; and Thomas Bean, Agricultural Safety Specialist. Modules were developed with funding from the Occupational Safety and Health Administration, U.S. Department of Labor, Grant Number 46E3-HT09.

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Keith L. Smith, Associate Vice President for Agricultural Administration and Director, Ohio State University Extension

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Tree Pruning, Trimming, and Felling Safety

Name____________________________________

True or False?

1. Hazards in tree pruning, trimming, and felling are electrocution, falling, noise, and being struck. T F
2. For your safety, use a fall-arrest harness attached to a secure part of the tree. T F
3. Use control lines on trees to direct their fall in the intended direction. T F
4. When felling, keep a distance of at least half of the length of the tree between the tree and people. T F
5. Safety observers do not need to wear protective clothing. T F
Trenching and Excavation Safety for Trainers and Supervisors

Objective: Demonstrate safe trenching and excavation.

**Trainer’s Note**

Trenching and excavation can be dangerous activities, leading to serious injuries and even death. For this module:

- Review the background information on trenching and excavation. Also, review hazards and safety guidelines.
- Discuss examples of trenching and excavation accidents. Ask workers to share any experiences they have had.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

**Note:** State laws on trenching and excavation vary. Even if operations are exempt, however, an operator may still be held liable for accidents. This module is not a strict legal interpretation of any particular state’s trenching and excavation laws. For more information on state trenching and excavation laws, consult your own state’s extension service.

**Background**

Taking safety precautions during trenching jobs may seem to waste time and money. However, if safety precautions are not taken, costly and even fatal accidents can occur. In addition to the loss of human life, possible costs of a trenching accident include:

- Work delays to save the victim.
- Extra time and labor to re-excavate the collapsed trench.
- Worker compensation costs and increased insurance fees.
- Extra paperwork due to the investigation of the accident.
- Fines may also be imposed.

Soil is a very heavy material. It may weigh more than 100 pounds per cubic foot. A cubic yard of soil (3 ft x 3 ft x 3 ft) contains 27 cubic feet of material. Thus, it may weigh more than 2,700 pounds. That is nearly one and a half tons in a space less than the size of the average office desk. One and a half tons is the same weight as a car. Wet soil, rocky soil, or rock is usually heavier. A worker can easily be crushed under the weight of these materials in a trenching accident.
General Requirements

- To identify the location of any underground cables or utility installations in the area of the proposed excavation, call your local utilities and local utilities protection service.
- State law may require workers to call your local utilities or local utilities protection service a specified period before breaking ground — for example, two days.
- Locate and mark these areas. Then avoid them.
- A backfilled trench might be located near a railroad, a road, a source of vibration, or other unstable condition. If so, take extra precautions to properly shore the trench. Also, brace the excavation to help prevent cave-ins.
- Do not undercut exposed vertical faces of trenches. It is prohibited unless supported by a specific method written into your state law or administrative code.
- All excavated or fill materials should be placed at least two feet away from the top edge of the trench.
- Materials may need to be placed closer than two feet from the edge of the trench. If so, install an effective barrier to prevent them from falling into the trench.

Key Guidelines

- The type of soil at the work site should be identified to reveal the level of danger. This is necessary to provide a safe work site.
- You should use the proper sloping, shoring, and bracing structures for each trenching or excavation site. They should be planned for the particular site and soil type.
- Proper design, construction, and placement of support structures will create a safe work environment.
- Trench failures often occur in multiples. Usually, soil near the bottom of the trench wall will move first. After the base fails, the entire wall will quickly erode. The wall will then collapse.

Three Safety Techniques Used to Control Earth Movement

**Shoring.** Wood or metal sheets should be braced tightly against the vertical walls of the trench. This will protect the workers in the trench. The sheets will also prevent the collapse of nearby structures. There are ways to reduce soil movement outside of the sheeting. Use struts, cross braces, or hydraulic trench jacks to support the sheets.

[Diagram of Shoring]

**Shielding.** Trench shields or portable trench boxes surround the workers with a strong wall of steel or concrete. Use this method when there is no support for adjacent structures.

**Sloping.** Move soil away from the sides of the trench until the walls are at a safe angle from the floor of the trench. The soil will remain at rest at angles ranging from 90 degrees to 26 degrees.

Review These Important Points

- Soil is an extremely heavy material.
- It is necessary to know the characteristics of the soil at the particular job site.
- You should contact your local utilities and local utilities protection service before breaking ground.
- Precautions need to be taken to prevent cave-ins.
About These Modules

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Trenching and Excavation Safety

Name____________________________________

True or False?

1. Soil may weigh more than 100 pounds per cubic foot. T F

2. It is not necessary to contact your local utilities. Only the local utilities protection service needs to be contacted. T F

3. Identification of the soil characteristics at the work site is not important. T F

4. Trench failures often occur in multiples. T F

5. Proper design, construction, and placement of support structures will allow employees to work in a safe environment. T F
Wood Chippers and Shredders Safety for Trainers and Supervisors

Objective: Operate wood chippers and shredders safely.

Trainer’s Note

Sharp knives and powerful engines make wood chippers and shredders dangerous tools. For this module:

- Review the information on hazards and safety tips below.
- Demonstrate how to use a wood chipper or shredder safely.
- Supervise workers carefully while they practice safety techniques.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

The knives on wood chippers and shredders are sharp enough to slice through fresh wood. The engines are powerful enough to grind thick branches and limbs. Those same knives and engines would make short work of a worker’s finger, a hand, or an arm. Workers can be pulled into the knives or struck by the chipper disc hood. Workers should never operate this equipment without training.

Hazards of Wood Chippers and Shredders

- Workers feeding materials into self-feeding chippers or shredders can get caught in chipper knives. A worker’s limb can be shredded. For more details on avoiding this type of accident, see the Tailgate Safety Training module Caught-In or Caught-Between Objects.
- An unlatched, improperly secured, or damaged hood can be thrown from the chipper or shredder. Fixtures can easily be thrown if they come into contact with the rotating knives.

Safety Tips for Selecting the Work Area

- Position the chipper or shredder so that workers do not have to stand on slopes when feeding material into the machine.
- Keep the area around the chipper or shredder free of tripping hazards.
- Put up warning signs to keep the public a safe distance from work area.
- Ensure that the dislodging chute is positioned to prevent chips from being blown in any direction.
Safety Precautions for Knives

- Wear a hard hat, sturdy slip-resistant footwear, eye protection, hearing protection, gloves without cuffs, and pants without cuffs.
- Keep shirt sleeves buttoned and shirts tucked into pants.
- Read the operator’s manual and complete training on proper use and safety precautions before using a chipper or a shredder.
- Do not work alone when using a chipper or a shredder.
- Test all safety and emergency shut-off devices before operating the chipper or the shredder.
- Make sure the material to be chipped is free from stones, metal, and other foreign objects.

Safety Precautions for Disc and Drum Hoods

- If the machine is out of order, tag it with a DO NOT USE tag. If possible, lock it out.
- Make sure that the hood covering the knives is completely closed.
- Run the machine at the lowest possible speed and listen for noises that might indicate broken parts.
- If you hear unusual noises, shut down the machine right away. Have it repaired by a qualified technician.
- Allow all internal machine parts to come to a complete stop before opening the hood covering the disc or drum.
- Wear gloves when handling the knives.
- Knives must be changed if damaged.
- When sharpened knives are fitted, maintain the clearance between the knives and the anvil.

Review These Important Points

- Keep the area around the chipper or the shredder free of tripping hazards.
- Make sure that the hood covering the knives is completely closed.
- Knives must be changed if damaged.

About These Modules

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Wood Chippers and Shredders Safety

Name____________________________________

True or False?

1. Work alone when using wood chippers or shredders. T F

2. Do not chip material that has stones, metal, and other foreign objects in it. T F

3. Run the machine at the highest possible speed and listen for noises that might indicate broken parts. T F

4. If a chipper or a shredder sounds unusual, turn it off and call for a technician. T F

5. Do not wear gloves when handling the knives. T F
Workplace Violence for Trainers and Supervisors

Objective: Identify the types of workplace violence and recognize behaviors that might lead to workplace violence.

Trainer’s Note

Workplace violence can range from verbal abuse to murder. For this module:

- Review the information below on:
  - Types of workplace violence.
  - Behaviors that can lead to it.
  - Ways to avoid it.
- Ask workers to describe their own experiences with workplace violence.
- Review the important points.
- Have workers take the True/False quiz to check their learning.

Background

Co-workers, supervisors, or visitors can commit workplace violence. Workers should know what behaviors might lead to violence. They should also know what to do if it occurs. And they should know that violence is not acceptable. Workers who commit a violent act in the workplace can lose their job or be arrested.

There are different types of workplace violence. A worker can be verbally abused or harassed. Or a worker can be physically assaulted or killed. Workplace violence is a leading cause of worker-related death in the country. Nearly two million workers are victims each year.

<table>
<thead>
<tr>
<th>Types of Workplace Violence</th>
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<tbody>
<tr>
<td>Assault</td>
<td>• Injuring someone with your fists, feet, or a weapon.</td>
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<tr>
<td>Criminal Mischief</td>
<td>• Intentionally damaging someone’s property without permission. For example, damaging someone’s car.</td>
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<tr>
<td>Disorderly Conduct</td>
<td>• Fighting.</td>
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<td></td>
<td>• Acting in a threatening manner.</td>
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<td></td>
<td>• Shouting abusively.</td>
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<td>• Disturbing others while they work.</td>
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<td></td>
<td>• Creating a dangerous condition in a way that is not legal.</td>
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### Types of Workplace Violence (continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>Harassment</td>
<td>- Deliberately hitting, pushing, or kicking someone.</td>
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<td>- Threatening to do so.</td>
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<td>- Using abusive or obscene language.</td>
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<td>- Following someone in a public area.</td>
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<td></td>
<td>- Acting in a way that suggests potential harm or danger.</td>
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<tr>
<td>Larceny</td>
<td>- Stealing someone’s possessions without using force.</td>
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<td></td>
<td>- Victim present or not present.</td>
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<tr>
<td>Menacing</td>
<td>- Making someone feel that he or she is in danger of being hurt.</td>
</tr>
<tr>
<td>Reckless Endangerment</td>
<td>- Acting in a way that puts others in danger.</td>
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<td>- For example, driving too fast in rush-hour traffic.</td>
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<tr>
<td>Robbery</td>
<td>- Using physical force to steal someone’s possessions.</td>
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<tr>
<td></td>
<td>- Victim present during the theft.</td>
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<tr>
<td>Sex Offenses</td>
<td>- Four general types:</td>
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<td>- Public lewdness</td>
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<td></td>
<td>- Sexual abuse</td>
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<td></td>
<td>- Sodomy</td>
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<td></td>
<td>- Rape</td>
</tr>
<tr>
<td></td>
<td>- Laws are different from state to state.</td>
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<td>- Ask your employer for more information.</td>
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### Ways to Avoid Workplace Violence

- Tell your supervisor about any situation that could be a threat to you or other workers.
- Ask your employer if safety education classes on workplace violence are offered.
- Ask your employer for information (e.g., brochures, fact sheets, etc.).

### Warning Signs of Potential Workplace Violence

- A worker makes abusive or threatening remarks about co-workers or supervisors.
- A worker shouts, throws objects, slams doors, or punches walls.
- A worker is fascinated with guns, other weapons, or violence in general.

### If Workplace Violence Occurs

- If possible, leave the area at once.
- Tell your supervisor if you or someone else is assaulted.
- If you cannot find your supervisor, call 911 for help.

### Review These Important Points

- Workers should be aware of the different types of workplace violence.
- Workers should know that workplace violence is not acceptable.
- Ask your employer if information on workplace violence is available.
- Always tell your supervisor if workplace violence occurs.
- Workplace violence is one of the leading causes of worker-related death in the United States.
About These Modules

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Workplace Violence

Name____________________________________

True or False?

1. Verbal abuse is not considered a type of workplace violence. T F

2. Workplace violence is one of the leading causes of worker-related death in the United States. T F

3. Criminal mischief is intentionally causing harm to the property of another worker without permission. T F

4. Harassment can involve physical contact and verbal abuse. T F

5. Tell your supervisor about any situation that makes you afraid for your safety. T F