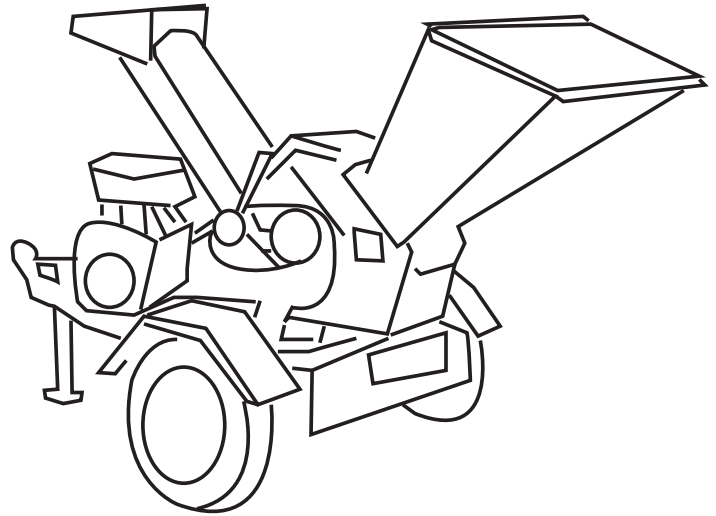


Chipper/ Shredder Safety

**For the Landscaping and
Horticultural Services Industry**



Chipper/ Shredder Safety

Contents

Introduction	
What's Inside?	3
Lesson 1	
Take Control of Your Own Safety	4
Lesson 2	
Prepare for Safe Operation	9
Lesson 3	
Avoid Being Caught in the Chipper	14
Lesson 4	
Avoid Being Struck by Equipment's Hood	18
Lesson 5	
Environmental Hazards	21
Conclusion	28
Quiz Yourself Solutions	31

Written by:

Sara Lind, Information specialist

Mitch Ricketts, Coordinator, Health, Safety and Environmental Quality, K-State Research and Extension

Disclaimer

This material was produced under grant number 46G3-HT04 and revised and updated under grant number SH-19503-09-60-F-20 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. D It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. government.

This booklet was produced by K-State Research and Extension, Kansas State University, Manhattan, Kansas.

The information in this publication has been compiled from a variety of sources believed to be reliable and to represent the best current opinion on the subject. However, neither K-State Research and Extension nor its authors guarantee accuracy or completeness of any information contained in this publication, and neither K-State Research and Extension or its authors shall be responsible for any errors, omissions, or damages arising out of the use of this information. Additional safety measures may be required under particular circumstances.

What's Inside?

This booklet teaches important safety practices to be followed when operating a chipper/shredder.

Safety tips, along with real accident reports, have been combined in order to give you a better understanding of the risks of incorrectly operating equipment as well as working in unsafe environments.

Use this booklet in conjunction with hands-on safety training and the equipment operator's manual.

Lesson 1

Objectives

1. Name the most common types of accidents involving wood chipper/shredders.
2. Interpret the meaning of common warning signs and labels.
3. Identify appropriate protective equipment.

Take Control of Your Own Safety

Greatest Dangers

You can be seriously injured or killed if you incorrectly operate a chipper/shredder. The most commonly reported causes of serious accidents are:

1. Being Caught in Moving Parts

You can be seriously injured or killed if you are caught in the equipment's moving parts.

Accident Report

Employee Killed in Chipper

Summary of OSHA Accident Inspection 300492832

An employee was chipping branches when the chipper became jammed. He tried to unjam the machine and was caught in the infeed roller and chopped to death by the blades.



Never reach in to a running chipper/shredder.

2. Struck by Chipper/Shredder's Hood

You can be seriously injured or killed if you open or close the hood on a running chipper/shredder.

Accident Report

Employee Struck by Chipper Hood

Summary of OSHA Accident Inspection 124829318

An employee attempted to close the hood on a running chipper. The hood struck some moving parts and hit the employee in the chin, flinging him backward. His head hit the pavement and he was killed.



Never open or close the hood of a running chipper/shredder.

Help Yourself

Safe work habits are important. Here are three important actions you can take to be safe on the job site.

1. Learn all you can.

To prevent accidents with wood chippers/shredders, read and follow directions in the equipment operator's manual. Pay attention to safety instructions in the manual and to warning labels you see on the equipment. If you have questions, stop and ask your supervisor before you continue.

2. Concentrate on working safely.

Sometimes you may be tempted to take risky shortcuts. Remember that an accident can leave you permanently injured or cut your life short. For your safety and the safety of those around you, do not take unnecessary risks. No deadline is so pressing you can't take the time to do your work safely.

3. Additional Precautions

Do not operate machinery if you are tired or have taken drugs or alcohol. If you are on medication, discuss with your doctor or pharmacist if you are capable of safely operating machinery.



Safety Messages and Signs

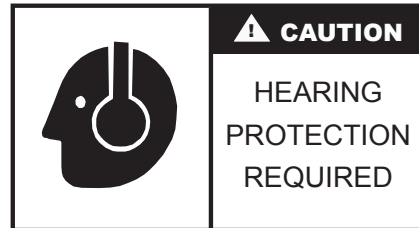
Manufacturers put important safety messages on each piece of equipment and in the operator's manual. It is critical to read, understand and follow all safety messages.



The triangle shape is the symbol for caution. The exclamation mark in the center means *Pay Attention*. In some instances, the triangle-shaped sign will show a picture. Other times, words explain why the sign is used.

Many safety messages use the words *Caution*, *Warning* and *Danger* to get your attention. Following are safety messages and their meanings. Each of these signs will have a written message, and perhaps a picture, about an unsafe condition.

CAUTION means you need to be careful. Follow the directions on the sign or you could get hurt.



WARNING is more serious and means you need to follow the directions on the sign or you could be badly hurt or killed.



DANGER is the most serious safety message. If you don't follow the directions, you will be seriously injured or killed.



Images displayed in the caution, warning and danger boxes have been recreated from images taken with permission from ASAE S441.3, FEB1999 (R2005), Safety Signs.

Protective Equipment

Certain equipment is necessary to protect your body from materials thrown from the chipper/shredder and to avoid being caught in the equipment's moving parts.

When operating a chipper/shredder, you should wear:

Close-fitting clothes and no jewelry

Loose shirt sleeves, pant legs or jewelry can catch in the equipment's moving parts, resulting in injury. Do not wear gloves with loose cuffs. Pull back long hair.

Long pants and sturdy, non-slip boots

Wear long pants, without cuffs, to protect your legs from objects that could be thrown from the chipper. Sturdy, non-slip boots will help you keep a firm footing on the ground and reduce the risk of slipping and falling into the chipper/shredder.

Safety glasses

Wear safety glasses to protect your vision.

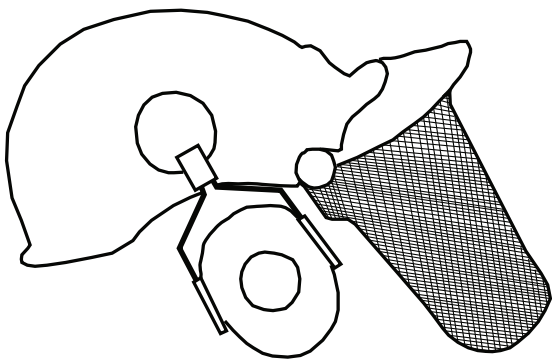
Hard hat

Wear a hard hat to protect your head from material that may be kicked out of the machine.

Hearing protection

Over time, you will lose your hearing if you are exposed to loud noises without protection.

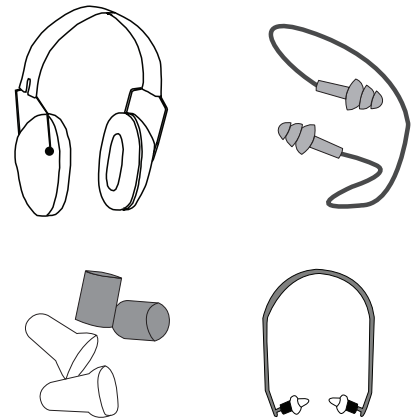
Two common types of hearing protection are muffs and plugs. Ear muffs should seal around your ears to properly muffle loud noises. Wash reusable ear plugs with warm, soapy water after each use in order to prevent infection. Discard disposable ear plugs after each use.



This logger's style safety helmet can also be used while operating a chipper/shredder. It contains a hard hat, hearing and face protection in one piece.

When to Wear Hearing Protection

OSHA Standard 1910.95 (i) (l) requires hearing protection to be worn when sound levels exceed certain limits (generally, a daily average of 85 or 90 decibels, depending on the circumstances). These levels can be measured with a sound level meter. A hearing conservation program requiring hearing tests and other precautions may also be necessary. Check with the equipment operator's manual, as well as your supervisor, for suggestions on hearing protection for each piece of equipment as well as instructions on how to wear it properly.



Hearing Protection Rules of Thumb

Hearing protection may be needed if:

- ▶ You have to raise your voice significantly to be heard by someone three feet away.
- ▶ After leaving a noisy area, your ears feel plugged or you hear a mild ringing or whooshing noise that goes away after an hour or two.
- ▶ When you start your car in the morning, the radio is so loud from the evening before that you have to turn it down.

Quiz Yourself

Answers can be found on page 31.

Circle the correct answer.

1. What are the two most commonly reported causes of serious injury and death from operating wood chippers?
 - a. Being caught in moving parts and being struck by the hood
 - b. Being struck by lightning and heat stroke
 - c. Being struck by debris and burns

Select the correct answer for the following sentences from the list below.

- a. Danger
 - b. Hard hat
 - c. Alcohol
 - d. Triangle
2. Do not operate machinery if you are under the influence of drugs or _____.
 3. The _____ shape is the symbol for caution.
 4. A _____ should be worn at all times when operating a chipper/shredder.
 5. _____ is the most serious safety message.

Prepare for Safe Operation

Pre-Start Inspection

Safety starts before the engine. Thoroughly inspect the chipper before beginning work each shift. Use the checklist on the following page as a guide. Alert your supervisor if you find anything wrong during your pre-start inspection.

Machine Placement

Place the machine on a level surface that is not concrete, paved or gravel. Operating on these surfaces can cause thrown material to ricochet and injure or kill the operator or bystanders. Also keep other workers from falling into the chipper/shredder by ensuring the location of the machine is not directly in front of or below where other employees are working.

Accident Report

Employee Falls When Rope Becomes Caught in Chipper

Summary of OSHA Accident Inspection 112887237

An employee was removing a tree when the tail section of the rope to which he was attached became entangled in the chipper located on the ground below. The employee fell approximately fifty feet and died.



Position equipment away from other workers.

Safety Decals

Ensure that all safety decals on the machine are legible. Replace any that cannot be read. Contact the chipper's manufacturer to order new decals. Contact information can be found in the operator's manual.

Missing or Damaged Guards

Guards and shields protect you from moving parts. Check the operator's manual for the location of guards and safety shields.

Accident Report

Operator Pulled Into Chipper

Summary of OSHA Accident Inspection 110902368

An employee was operating a wood chipper without all guards in place. He became caught in the rollers and was pulled through the chipper and killed.



Never operate equipment without all guards in place.

Lesson 2

Objectives

1. Indicate features to be inspected before operation.
2. Recognize safe operating procedures.
3. Identify safe transportation and traffic guidelines.

Pre-Start Checklist

Machine Placement

- On level surface?
- Not on paved, concrete or gravel surface?

Safety Decals

- Legible?

Guards

- All guards in place?
- No sign of damaged guards?

Hood

- Closed?
- Latched?
- Pins in place?
- Hinges not damaged?

Cutting Chamber

- Free of foreign objects?
- Free of wood and other debris?

Fluid Leaks

- No sign of fluid leaks?

PTO

- Shaft fitted with suitable guard?
- Speed suitable for machine?

Protective Clothing and Equipment (as needed)

- No loose clothing or jewelry
- Long pants
- Sturdy, non-slip boots
- Eye protection
- Hard hat
- Hearing protection

Buddy System

- Work in groups of two or more
- Make sure someone knows your plans

Hood

Ensure the hood, enclosing the chipper/shredder's knives, is closed and latched before operating. Also, check for loose or missing pins in the hood latch as well as cracked or worn hinges. If the hood is not properly secured, it could fly off and seriously injure or kill you. The chipper/shredder should never be operated with the hood open.

Accident Report

Hood Strikes Employee in Head

Summary of OSHA Accident Inspection 114119498

An employee was trying to open or close the chipper hood when it was struck by the disc. As the disc hit the hood, the hood was flung off its hinge, striking the employee in the head and killing him. Two latch pins and three mounting bolts were found after the accident had occurred. They had been removed prior to the accident.



Always inspect equipment for broken or missing parts, before operating.

Cutting Chamber

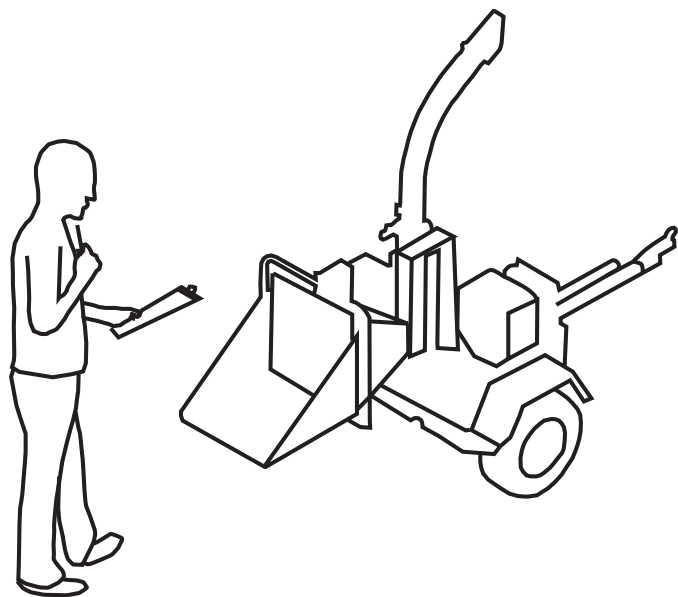
Ensure the cutting chamber is free of foreign objects or other debris such as accumulated wood. Wood and foreign objects can be thrown from the chipper at high rates of speed.

Fluid Leaks

Fluid leaks can cause fires and breakdowns. Report signs of leaking fluid to your supervisor immediately.

Power Take-Off (PTO)

Check to make sure the PTO shaft is fitted correctly with a suitable guard. Also, check the operator's manual to ensure the PTO speed is suitable for the machine.



Using a Buddy System

1. Always work in groups of two or more. Be aware at all times of the location of coworkers.
2. Make sure someone knows your plans: where you are going, what you are doing and when you are going to be back.
3. If you have any severe allergies (such as bee sting), make sure someone you are working with knows about the allergy and what to do in the event of an allergic reaction.

Safe Startup Procedures

- ▶ Start the chipper/shredder at the lowest possible speed and listen for any noise or vibration that could indicate loose or broken parts. If heard, turn off the machine.
- ▶ Be aware at all times of the location of coworkers. Keep all others out of the area.
- ▶ Check the operator's manual for additional procedures.

PTO

Additional precautions for PTO-driven models:

1. Ensure the PTO is hitched securely and level according to the operator's manual.
2. Put the tractor in neutral and set the parking brake.
3. Start the tractor engine, engage PTO clutch and then increase speed to recommended RPM.

Safe Shutdown Procedures

- ▶ Disconnect the power supply and remove key. You can tell the machine has stopped when no noise or vibration is heard.
- ▶ Check the operator's manual for additional procedures.

Those with severe allergies to insect stings should consult a physician about carrying a prescription medical kit. The kit contains medicine and instructions to be used if the person is stung. If the kit is used, the victim still must receive medical attention. Call for help or take them to the nearest hospital.

Accident Report

Chipper Hood Strikes Employee in Stomach

Summary of OSHA Accident Inspection 119960789

An employee turned off a chipper's motor, but did not wait the recommended (by the manufacturer) five minutes before opening the hood to allow the parts to come to a stop. When the employee opened the hood, the flywheel struck the edge of the hood and flung it into the employee's stomach. His intestines were bruised and had to be partially removed.



Wait for all moving parts to come to a complete stop before opening the hood.

To Properly Fill Fuel Containers:

1. Set the container on the ground.
2. Touch the fuel nozzle to the container before opening the fuel cap so that any static spark will not ignite vapors.
3. Keep the nozzle in contact with the container while filling.
4. Don't fill to the brim. Leave room for expansion. Portable containers and gas tanks should be filled $\frac{3}{4}$ full.

Safe Fueling Procedures

Gasoline and other fuels are flammable. Following safe fueling procedures will help reduce the risk of fuel ignition.

- ▶ Always shut off the engine and wait at least 5 minutes for the engine to cool before refueling.
- ▶ Use only approved fuel containers and store in a well ventilated area, away from direct sunlight.
- ▶ Never smoke or have an open flame near fuel.
- ▶ Touch the fuel nozzle to the chipper/shredder before opening the fuel cap to reduce the chance that a static spark will ignite the fuel. Keep the nozzle in contact with the filler neck while fueling. Replace the cap as soon as you are finished.
- ▶ Use a funnel or non-spill nozzle when fueling to reduce spillage.
- ▶ Wipe up all spills immediately, before starting the engine.
- ▶ Never clean your hands or tools with gasoline. Use a nonflammable solvent instead.

Transportation & Traffic

Never move, load or transport a chipper/shredder while the engine is running. First, shut off the power supply, wait for all moving parts to come to a complete stop and then disconnect the spark plug wire (if applicable).

When towing, be sure to connect safety hitch chains and tighten and secure trailer hitch bolts. Rotate the chipper/shredder's discharge chute in a direction where it will not strike objects along the roadway. Equipment should only be towed at the manufacturer's recommended speed.

If the chipper/shredder is operated near a roadway, make sure it is positioned far enough away to not interfere with the flow of traffic or injure passers by. Use flags and warning signs to alert motorists that there are employees in the area. These employees should wear highly reflective vests. Ensure the discharge chute is pointed away from the roadway as well. This will keep debris from flying toward traffic.

Accident Report

Chipper Overturns on Employee

Summary of OSHA Accident Inspection 111895140

An employee was sitting on a chipper that was loaded on a trailer. As the trailer was moving, it hit a hole in the ground and the chipper tipped over. The employee's hand was pinned between the chipper and the ground. He sustained severe cuts to his left hand.



Never sit on any part of the equipment under any circumstance.

Quiz Yourself

Answers can be found on page 32.

Select the correct answer for the following sentences from the list below.

- a. The manufacturer's recommended speed
 - b. Level
 - c. Five
 - d. Latched
 - e. Allergies
 - f. Signs
1. To set up a chipper/shredder for operation, choose a surface that is _____.
 2. Before operating the chipper/shredder, check to see that the hood is closed and _____.
 3. When working outside, it is important to know if your coworkers have any severe _____.
 4. The gas tank should be filled after the engine has cooled for at least _____ minute(s).
 5. When towing a chipper/shredder, your speed should never exceed _____.
 6. When working near traffic, use flags and warning _____ to alert motorists that there are employees in the area

Lesson 3

Objectives

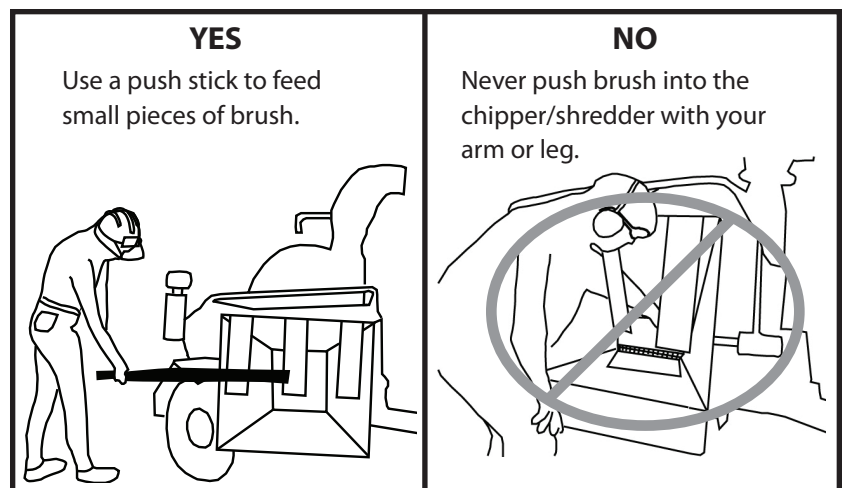
1. Develop safe feeding procedures.
2. Recognize how to protect yourself from moving parts.

Avoid Being Caught in Moving Parts

Safe Feeding Procedures

Materials should be fed into the chipper/shredder safely, to avoid contact with the equipment's moving parts. Follow these feeding procedures to keep you safe.

- ▶ Feed material only when the chipper/shredder is at full operating speed.
- ▶ Feed branches from the side of the chute, not in front of it. This will reduce the risk of you being caught and dragged into the machine. Standing to the side of the equipment will also make it easier for you to reach the emergency shut-off switch in the event of an accident.
- ▶ Keep hands and feet outside of the feed chute.
- ▶ Use a push stick to help feed small pieces and brush through the chipper/shredder to keep you at a distance from the machine's moving parts. Do not push materials into the chute with your hands or feet, pitch forks, shovels, etc.
- ▶ Let go of material as soon as it begins to be pulled into the machine and walk away to avoid being hit or dragged into the chipper by limbs you are feeding.
- ▶ Feed the branches butt end first to keep the chipper from being jammed and to reduce the kickback of material.
- ▶ Lay shorter pieces of material on top of longer pieces and feed through the machine.
- ▶ Collect small materials such as leaves and twigs and put them with the chipped material instead of feeding them through the chipper/shredder.



Moving Parts

Follow these steps to avoid losing body parts or your life in the equipment's moving parts.

- ▶ Never leave the chipper/shredder unattended. This helps protect children and unauthorized persons who may go near the equipment.
- ▶ Never inspect or work on equipment while it is running. This will protect you from the machine's moving parts.
- ▶ Never operate the chipper/shredder without all guards in place. These guards were put on the machine by the manufacturer to keep you from being caught in moving parts. Never remove or redesign these guards.
- ▶ Keep hands and feet away from all moving parts.
- ▶ Before attempting to unclog debris or make adjustments:
 1. Shut off engine.
 2. Disconnect spark plug wire or battery cables (if equipped).
 3. Remove key.
 4. Disconnect PTO shaft (if equipped).
 5. Wait for all parts to stop moving.
- ▶ Eliminate tripping hazards by clearing all brush and debris from the front and sides of the machine. This will keep you from falling into its moving parts.
- ▶ Never climb or sit on the chipper/shredder while it is running.

Accident Report

Operator's Foot Amputated in Chipper

Summary of OSHA Accident Inspection 100746346

The operator of a chipper was feeding small branches with his foot. The foot became caught in the infeed rollers and was pulled into the chipper. His right foot and ankle were amputated.



***Never feed material with any part of your body.
Always use a push stick.***

Accident Report

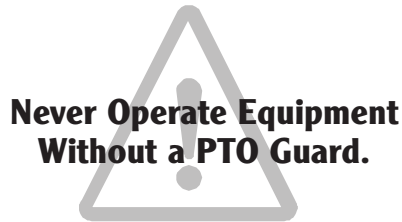
Employee Loses Hand in Chipper

Summary of OSHA Accident Inspection 125903088

An employee was operating a chipper that became jammed. He climbed on top of the chipper and unfastened the hood. His hand slipped into the rotating blades and was cut off at the wrist.



Shut off the machine and wait for all parts to stop moving before servicing equipment.



PTO Safety

A rotating PTO shaft can quickly catch your clothing or hair and wrap your body around the shaft, killing you before you can react. However, PTO accidents are preventable. Follow these steps to safely work around PTO shafts.

- ▶ Never operate equipment without the PTO shields in place.
- ▶ Ensure the shaft is secured to the tractor.
- ▶ Keep all bystanders, especially children away from the shaft.
- ▶ Keep hands, feet, clothing and hair away from the shaft.
- ▶ Walk around a PTO shaft, never step over it.
- ▶ Never inspect, service, lubricate or adjust the PTO unless the PTO is disengaged, the tractor engine is shut off and the shaft has stopped rotating.

Did You Know?



A PTO shaft rotating at 540 rpm can wrap about 424 feet of string in one minute. This means that it would take a person 6 feet tall, **less than 1 second to become entangled.**



Becoming entangled in the shaft can cause suffocation or amputation of limbs. It can also cause clothing to be torn from your body resulting in second-degree burns and/or severe cuts in your skin.



A replacement PTO shield is inexpensive and can be bought from most parts stores and manufacturers.

Quiz Yourself

Answers can be found on page 33.

Select the correct answer for the following sentences from the list below.

- a. PTO shaft
- b. Let go
- c. Side
- d. Butt end
- e. Inspect
- f. Reach
- g. All guards

1. When feeding material, feed from the _____ of the chute.
2. Branches should be fed into the chipper/shredder _____ first.
3. Never operate a chipper/shredder without _____ in place.
4. A rotating _____ can quickly catch your clothing or hair and wrap your body around it.
5. Never _____ into the infeed hopper.
6. Do not _____ or work on equipment while the engine is running.
7. _____ of material as soon as it begins to be pulled into the chipper/shredder.

Lesson 4

Objectives

1. Recognize how to prevent injury from the chipper/shredder hood.
2. Identify the location of the hood on different chipper/shredder models.
3. View different warning labels on chipper/shredder hoods.

NOTE: The following information has been covered in previous chapters. Due to the seriousness of this issue, please review the information.

Avoid Being Struck by the Hood

Prevent Injury from the Hood

The hood that covers the chipper/shredder's rotating blades can fly off and seriously injure or kill you. Take the following steps to protect you from the equipment's hood.

- ▶ Check to see that the hood latch is secured. Check for any missing parts or hinges that may allow the hood to become loose.
- ▶ When starting the machine, unless the manufacturer recommends otherwise, begin by running it at the lowest possible speed and then increase to full operating speed while listening for unusual vibrations indicating loose or broken parts. Stop the engine immediately if there is any unusual noise.
- ▶ Do not attempt to open or close the hood of the chipper while it is running. Close the hood before starting the engine.
- ▶ After turning off the engine, wait for all parts to stop moving and disconnect the spark plug wire or driveshaft before opening the hood.

Accident Report

Operator Struck by Chipper Hood

Summary of OSHA Accident Inspection 106387681

The operator of a running chipper went near the hood and removed the top pin. The hood flew off and struck him in the face and chest, killing him.



Shut off the machine and wait for all moving parts to stop before opening the hood.

Accident Report

Hood Strikes Operator's Chest

Summary of OSHA Accident Inspection 102782224

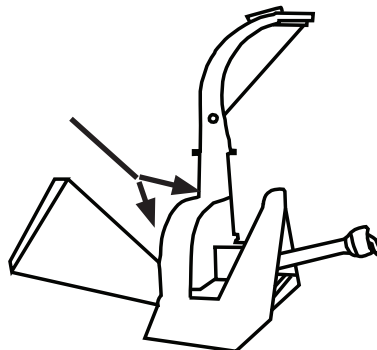
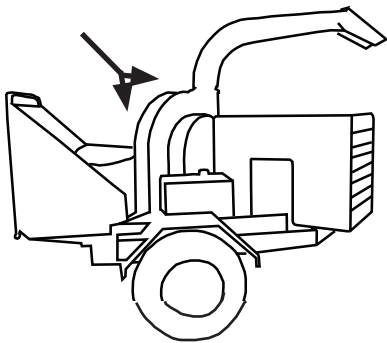
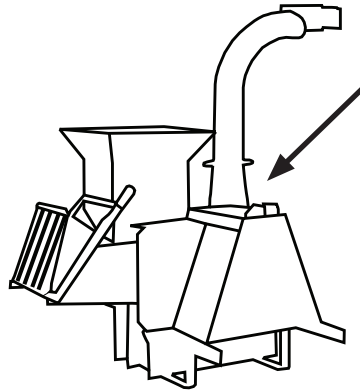
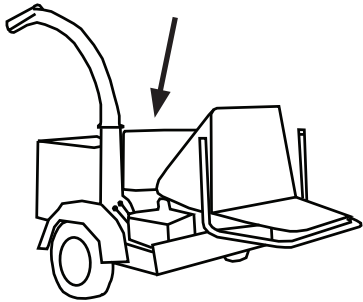
The operator of a chipper removed the hood covering the blade without shutting the machine off. The rotating blade struck the hood, ripped it off its hinges and threw it at the operator, striking him in the chest. The operator died.



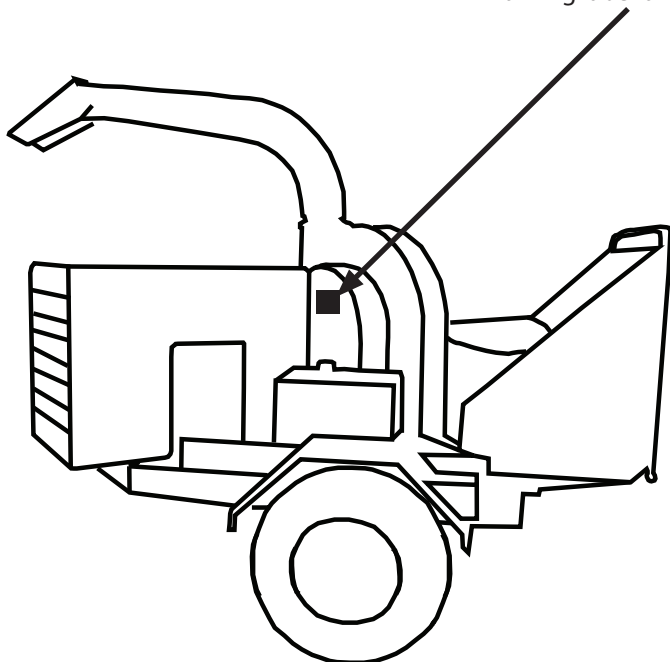
Never open or remove the hood of a running chipper/shredder.

Hood Identification

As different models of wood chippers vary, so does the location of the hood. Below are illustrations of different types of chippers with a reference arrow or bracket pointed at the hood.

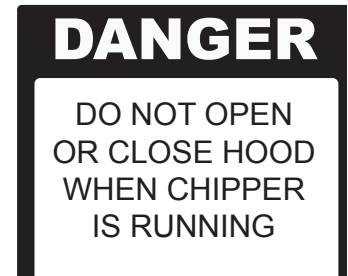


Warning label on hood.



Warning Labels

Below are examples of warning labels you might see on or around chipper/shredder hoods.



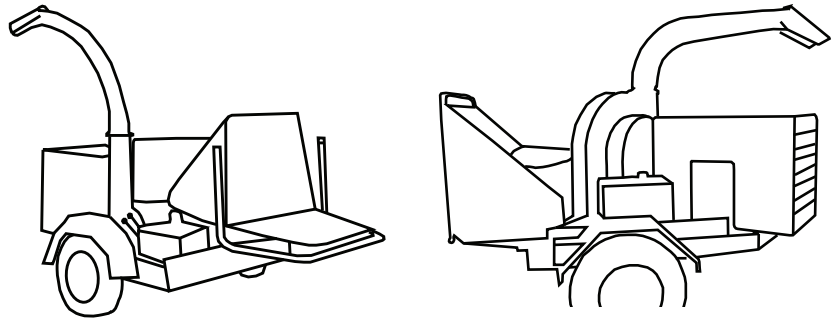
Quiz Yourself

Answers can be found on page 34.

Select the correct answer for the following sentences from the list below.

- a. Stop
- b. Open
- c. Close
- d. Parts

1. Never operate a chipper/shredder with the hood _____.
2. After turning off the engine, wait for all moving parts to come to a complete _____ before inspecting the machine or opening the hood.
3. _____ the chipper/shredder hood before starting the engine.
4. Check for any missing _____ or hinges prior to operation.
5. Draw an arrow pointing to the location of the hood on the following models.



Environmental Hazards

Heat Stress

You can become seriously ill or die if you do not take the proper precautions while working in high temperatures and humidity. Heat can reduce physical performance, as well as mental alertness, causing more accidents.

Heat Facts

- ▶ You are more likely to suffer from a heat related illness on humid days.
- ▶ If you are not used to working in the heat, you are more likely to suffer from a heat related illness. It can take your body anywhere from 5 days to 2 weeks to be acclimated to working in the heat. It is recommended that new workers who begin in hot, humid weather, start out by working half of the normal time and workload on the first day and then build up to a complete day by the end of the week.
- ▶ You are more vulnerable to heat illness if you have suffered from it in the past.
- ▶ During the course of the day, you can produce as much as two to three gallons of sweat. Replenish this fluid by drinking liquids so that you do not suffer from a heat related illness.

Accident Report

Employee Dies of Heat Stroke

Summary of OSHA Accident Inspection 014444699

An employee was dragging tree branches and feeding them into the chipper. Shortly before noon, the temperature had risen into the 80s. The employee became overheated and collapsed. He was taken to the hospital where he was pronounced dead due to heat stroke.



Take frequent, short breaks and drink plenty of water to keep yourself cool and hydrated.

Lesson 5

Objectives

1. Identify environmental hazards.
2. Recognize treatment and first aid for exposure to environmental hazards.

Heat Exhaustion Symptoms

Heat exhaustion is a serious illness and needs to be treated immediately before a heat stroke occurs. If you or a coworker experience any of the following symptoms, cool off immediately and drink plenty of water.

- Dizziness
- Lightheadedness
- Headache
- Feeling weak, fatigued
- Clammy and moist skin

Heat Stroke Symptoms

Heat stroke is a medical emergency that can become fatal. If anyone experiences the following symptoms of heat stroke, call 911 immediately.

- Hot, dry, red skin (not sweaty)
- Disorientation
- Confusion
- Body temperature greater than 105° F
- Convulsing
- Unconsciousness

What to Do for a Heat Illness

- ▶ If someone feels overheated, move him or her into a cooler, preferably air conditioned area. Watch the person and seek medical attention if needed.
- ▶ Fan the person in order to increase cooling.
- ▶ Have the person drink plenty of fluids.
- ▶ If the person goes into convulsions or shows symptoms of heat stroke, call 911 immediately and take steps to cool them down such as soaking their clothing in cool water.

Avoid Heat Related Illnesses

It is important to keep yourself hydrated and cool while working outside.

- ▶ Drink water often throughout the day; don't wait until you're thirsty to get a drink. At least a quart of water per hour is recommended. Sports drinks can also be consumed to replace electrolytes lost through dehydration.
- ▶ Stay away from soda, coffee, tea and alcoholic drinks that dehydrate the body.
- ▶ Avoid large meals before working in the heat.
- ▶ Some prescriptions can make you more susceptible to heat illnesses. Check with your doctor or pharmacist to see if any medicine you are taking could affect you while working in the heat.
- ▶ Wear light-weight fabric, such as cotton, to help keep your body cool.
- ▶ Wear a hat or sun visor on sunny days to help control body temperature.
- ▶ Plan to do the heaviest work at the coolest part of the day. This is usually between 6 a.m. and 10 a.m.
- ▶ Take frequent, short breaks in shaded areas to cool down.
- ▶ Do not take salt tablets, unless recommended by your doctor. Most people receive enough salt in their diet to account for the salt that is lost through sweating

Sun Exposure

Prolonged exposure to sunlight causes skin cancer, cataracts and other serious illnesses.

- ▶ Choose a sunscreen that is marked broad-spectrum. This will protect you from both UVA and UVB rays. Ensure the Sun Protection Factor (SPF) is at least 15.
- ▶ Wear a hat or sun visor, sunglasses, and lightweight long-sleeve shirts and pants on sunny days to help control body temperature and block the sun.

Lightning Precautions

Lightning strikes injure and kill hundreds of people each year. Follow these precautions to stay safe when the weather turns bad.

- ▶ As soon as you hear thunder, shut off and put away equipment and move indoors out of the storm. When you are able to hear thunder, you are able to be struck by lightning. Lightning can strike even when it's not raining.
- ▶ The cab of an enclosed vehicle provides some protection from lightning but a sturdy building provides the best protection.
- ▶ Listen to the radio for weather updates and storm warnings.

If You Can't Take Cover Inside

- ▶ Get to a low space. Lightning strikes the tallest objects.
- ▶ Crouch down on the balls of your feet. Place your hands on your knees and lower your head between your knees.
- ▶ Minimize contact with the ground.
- ▶ Do not lie flat on the ground. This will make you a larger target.

Keep Away From ...

- ▶ Large, lone trees and towers, fences, telephone poles and power lines.
- ▶ Rivers, lakes, pools and other bodies of water.
- ▶ Metal objects, tools, equipment, wire fences and umbrellas.

If Someone is Struck by Lightning

- ▶ Call 911.
- ▶ Check to see if they're breathing. Rescue breathing or CPR may be required.
- ▶ Check for burns on the body.
- ▶ Move the victim inside, out of the storm.
- ▶ **Note: Most lightning-strike victims survive with immediate treatment and rescue breathing or CPR.**

Lightning Facts

- ▶ A person that is struck by lightning **DOES NOT** retain an electric charge that can shock you.
- ▶ Lightning can spread as far as 60 feet after striking the ground.
- ▶ Lightning can travel at speeds of 100,000 mph.
- ▶ The temperature of a bolt of lightning can be as high as 50,000° F.
- ▶ Lightning **CAN** strike the same place twice.

Cold-Induced Injury or Illness Treatment Tips

- ◆ Move the person out of the cold and into an area that is warm and dry.
- ◆ Remove wet and tight clothing and cover the person with a blanket.
- ◆ Never rub the affected area. This will cause further skin and tissue damage.
- ◆ Seek medical attention immediately.

Cold-Induced Injuries and Illnesses

Prolonged exposure to freezing temperatures can result in cold-induced injuries and illnesses that can seriously injure or kill you. Cold temperatures reduce mental alertness and cause fatigue and exhaustion that can lead to accidents.

Frostbite

Frostbite occurs when parts of the body become so cold that the skin and tissue freezes. Frostbite normally occurs on ears, nose, fingers, hands, toes and feet or other parts of the body that are left uncovered in below-freezing temperatures. Frostbitten skin becomes numb and turns a pale white color.

Hypothermia

Hypothermia occurs when a person's body temperature drops to or below 95° F. Common symptoms include bluish-colored skin, uncontrollable shivering and drowsiness or fatigue.

Avoid Cold-Induced Injuries and Illnesses

- ▶ Layer clothing when working in cold temperatures; you can easily take off layers if you are too warm.
- ▶ Wear a hat and gloves.
- ▶ Keep muscles warm and loose by moving as much as possible.
- ▶ Take frequent, short breaks in warm areas.
- ▶ Perform work at the warmest part of the day, typically in the afternoon.
- ▶ Never work alone.

Insect Stings

Insect stings can be treated without medical attention unless the person suffers an allergic reaction.

The first step to treating an insect sting is to remove the stinger. This can be done by using a straight edge to scrape off the stinger or by using tweezers to pull it out. If you choose to use tweezers to remove the stinger, use extreme caution to not puncture the protruding venom sac.

After the stinger has been removed, a cold pack can be used during the first 24 hours to suppress pain and swelling. Following the first 24 hours, heat should be applied if pain or swelling persist.

Those with severe allergies to insect stings should consult a physician about carrying a prescription medical kit. The kit contains medicine and instructions to be used if the person is stung. If the kit is used, the victim still must receive medical attention. Call for help or take them to the nearest hospital.

Snake Bites

If you are bitten by a snake, seek medical attention immediately and try to describe the size and color of the snake to the doctor. This can help the doctor determine whether or not the snake was poisonous.

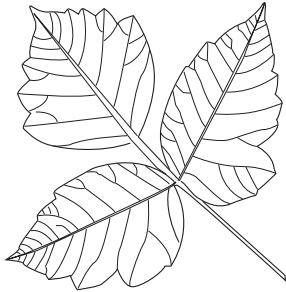
Never cut, suck or apply cold packs to snake bites.

Mammals

Be aware of animals such as squirrels or bats that may be in trees or bushes and startle you during work. Also, be cautious of animals such as rats, skunks and raccoons that could be rabid.

Poison Ivy, Oak and Sumac

- ▶ Wash the affected area and all clothing and tools that may have touched the plant.
- ▶ Avoid scratching the area if possible, to prevent infection.
- ▶ Hot and cold compresses can be used to suppress itching.
- ▶ Consult a doctor if the rash is on the face, inside the mouth or covers a large portion of the body.



Poison Ivy:
Leaves are usually
found in clusters of three.

Treating Cuts and Burns

Minor cuts and burns can be treated on the job site.

Seek medical attention if:

- ▶ Cuts are severely bleeding, more than one-half inch long and one-quarter inch deep, or the result of a puncture wound.
- ▶ Burn area covers more than one-fifth of the body with blisters, blisters occur on the hands, feet, face or genitalia, or if the skin is blackened or charred.

Treating Cuts

- ▶ Clean the area thoroughly.
- ▶ Remove any debris that may be in the wound.
- ▶ Apply pressure to the wound using gauze or a clean, absorbent cloth until the bleeding stops. If blood seeps through the cloth, do not remove it, continue adding more gauze or cloth over the previous one.
- ▶ Apply an antibiotic ointment and cover with a bandage or clean gauze.
- ▶ Allow wound to heal and keep dirt from creating infection by changing the bandage or gauze frequently.
- ▶ If a limb has been amputated, elevate while applying direct pressure and call 911.

Treating Burns

- ▶ Cool the burn by placing it under cool running water or in a container of cool water for at least 15 minutes.
- ▶ Cover the area with gauze or a clean cloth.
- ▶ Allow burn to heal and keep dirt from creating infection by changing the gauze frequently.
- ▶ If blisters occur, do not break them. Cover with gauze and allow them to break on their own.

First Aid Kit Contents

The following is a list of minimum requirements for workplace first aid kits as outlined by ANSI Standard Z308.1-2003*.

- ▶ absorbent compress
- ▶ adhesive bandages
- ▶ adhesive tape
- ▶ individual-use antiseptic applications
- ▶ individual-use burn treatment applications
- ▶ latex-free medical exam gloves
- ▶ sterile pads
- ▶ triangular bandage

*ANSI Z308.1-2003 is published by the International Safety Equipment Association, Arlington, VA, www.safetysafetyequipment.org. Used with permission.

Quiz Yourself

Answers can be found on page 35.

Circle the correct answer.

1. Stop a cut from bleeding by applying _____.
 - a. Aloe
 - b. Ointment
 - c. Direct pressure
2. Dizziness, light headedness, headache and fatigue are all symptoms of _____.
 - a. Lightning strike
 - b. Heat exhaustion
3. It is important to take frequent, short _____ when working outside.
 - a. Strides
 - b. Phone calls
 - c. Breaks
4. To keep myself hydrated when working outside, I should drink _____.
 - a. Water frequently throughout the day
 - b. Only when I'm thirsty
 - c. Soda at lunchtime
5. Lightning strikes the _____ objects.
 - a. Tallest
 - b. Widest
 - c. Shortest

Select the correct answer for the following sentences from the list below.

- a. Immediately
 - b. Stinger
 - c. Wash
 - d. Frostbitten
 - e. Lower
6. Never rub an area that has been _____.
 7. The first step to treating an insect sting is to remove the _____.
 8. If you contact poison ivy, oak or sumac, _____ the affected area as well as all clothing and tools.
 9. Hypothermia occurs when body temperature drops to 95° or _____.
 10. If a person with a known allergy to insects is stung, call for help _____.

Conclusion

Wood chippers/shredders can seriously injure or kill if not operated correctly. On the job accidents can be avoided by developing safe work habits before, during and after machinery operation.

You have been presented with checklists, safety tips and exercises designed to help you avoid the most commonly reported causes of wood chipper/shredder operation injuries and deaths, as well as other important safety precautions to consider. Use this information to keep your work experience safe.

Quiz Yourself

Answers can be found on page 36 and 37.

Circle the correct answer.

1. What are the two most commonly reported causes of serious injury and death from operating wood chippers/shredders?
 - a. Cuts and burns
 - b. Dehydration and fatigue
 - c. Being caught in moving parts & being struck by the hood

2. A pre-start inspection should be performed _____.
 - a. Whenever is convenient
 - b. Once a month
 - c. At the start of each work shift

3. A chipper should never be operated with the hood _____.
 - a. Open
 - b. Closed

4. A chipper/shredder should be operated on a _____ surface.
 - a. Concrete
 - b. Gravel
 - c. Level

5. When feeding brush into the chipper, use a _____ to push small pieces through.
 - a. Leg
 - b. Push stick
 - c. Pitch fork

Quiz continues on next page.....

Continued from previous page.....

Select the correct answer for the following sentences from the list below.

- a. Coolest
- b. Guard
- c. Thunder
- d. Large meals
- e. Call 911

6. PTO-powered equipment should never be operated without a _____.

7. If a limb has been amputated, elevate it, apply direct pressure, and _____.

8. The heaviest work should be done at the _____ part of the day.

9. Avoid _____ before working in the heat.

10. If you can hear _____ then you are able to be struck by lightning.

Quiz Yourself

Solutions

Lesson 1

Circle the correct answer.

1. What are the two most commonly reported causes of serious injury and death from operating wood chippers?
 a. Being caught in moving parts and being struck by the hood
b. Being struck by lightning and heat stroke
c. Being struck by debris and burns

Select the correct answer for the following sentences from the list below.

- a. Danger
b. Hard hat
c. Alcohol
d. Triangle
2. Do not operate machinery if you are under the influence of drugs or c.
3. The d shape is the symbol for caution.
4. A b should be worn at all times when operating a chipper/shredder.
5. a is the most serious safety message.

Lesson 2

Select the correct answer for the following sentences from the list below.

- a. The manufacturer's recommended speed
- b. Level
- c. Five
- d. Latched
- e. Allergies
- f. Signs

1. To set up a chipper/shredder for operation, choose a surface that is **b** .
2. Before operating the chipper/shredder, check to see that the hood is closed and **d** .
3. When working outside, it is important to know if your co-workers have any severe **e** .
4. The gas tank should be filled after the engine has cooled for at least **c** minute(s).
5. When towing a chipper/shredder, your speed should never exceed **a** .
6. When working near traffic, use flags and warning **f** to alert motorists that there are employees in the area.

Lesson 3

Select the correct answer for the following sentences from the list below.

- a. PTO shaft
- b. Let go
- c. Side
- d. Butt end
- e. Inspect
- f. Reach
- g. All guards

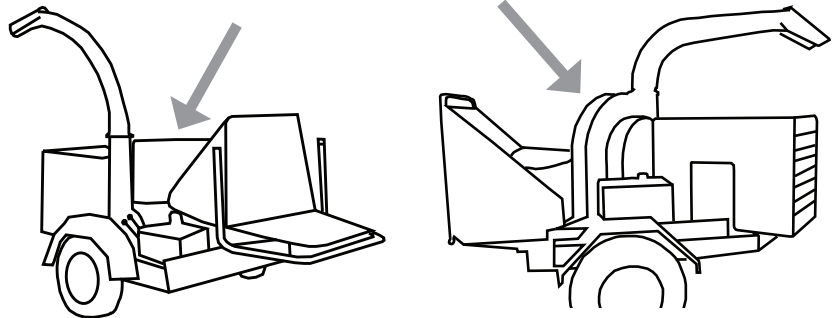
1. When feeding material, feed from the **c** of the chute.
2. Branches should be fed into the chipper/shredder **d** first.
3. I should never operate a chipper/shredder without **g** in place.
4. A rotating **a** can quickly catch your clothing or hair and wrap your body around it.
5. Never **f** into the infeed hopper.
6. Do not **e** or work on equipment while the engine is running.
7. **b** of material as soon as it begins to be pulled into the chipper/shredder.

Lesson 4

Select the correct answer for the following sentences from the list below.

- a. Stop
- b. Open
- c. Close
- d. Parts

1. Never operate a chipper/shredder with the hood **b**.
2. After turning off the engine, wait for all moving parts to come to a complete **a** before inspecting the machine or opening the hood.
3. **c** the chipper/shredder hood before starting the engine.
4. Check for any missing **d** or hinges prior to operation.
5. Circle the location of the hood on the following models.



Lesson 5

Circle the correct answer.

1. Stop a cut from bleeding by applying _____.
 - a. Aloe
 - b. Ointment
 - c. Direct pressure
2. Dizziness, light headedness, headache and fatigue are all symptoms of _____.
 - a. Lightning strike
 - b. Heat exhaustion
3. It is important to take frequent, short _____ when working outside.
 - a. Strides
 - b. Phone calls
 - c. Breaks
4. To keep myself hydrated when working outside, I should drink _____.
 - a. Water frequently throughout the day
 - b. Only when I'm thirsty
 - c. Soda at lunchtime
5. Lightning strikes the _____ objects.
 - a. Tallest
 - b. Widest
 - c. Shortest

Select the correct answer for the following sentences from the list below.

- a. Immediately
 - b. Stinger
 - c. Wash
 - d. Rub
 - e. Lower
6. Never rub a body part that has been **d** _____.
 7. The first step to treating an insect sting is to remove the **b** _____.
 8. If you contact poison ivy, oak or sumac, **c** _____ the affected area as well as all clothing and tools.
 9. Hypothermia occurs when body temperature drops to 95° or **e** _____.
 10. If a person with a known allergy to insects is stung, call for help **a** _____.

Conclusion

Circle the correct answer.

1. What are the two most commonly reported causes of serious injury and death from operating wood chippers/shredders?
 - a. Cuts and burns
 - b. Dehydration and fatigue
 - c. Being caught in moving parts and being struck by the hood
2. A pre-start inspection should be performed _____.
 - a. Whenever is convenient
 - b. Once a month
 - c. At the start of each work shift
3. A chipper should never be operated with the hood _____.
 - a. Open
 - b. Closed
 - c. Latched
4. A chipper/shredder should be operated on a _____ surface.
 - a. Concrete
 - b. Gravel
 - c. Level
5. When feeding brush into the chipper, use a _____ to push small pieces through.
 - a. Leg
 - b. Push stick
 - c. Pitch fork

Select the correct answer for the following sentences from the list below.

- a. Coolest
- b. Guard
- c. Thunder
- d. Large meals
- e. Call 911

6. PTO-powered equipment should never be operated without a **b** .

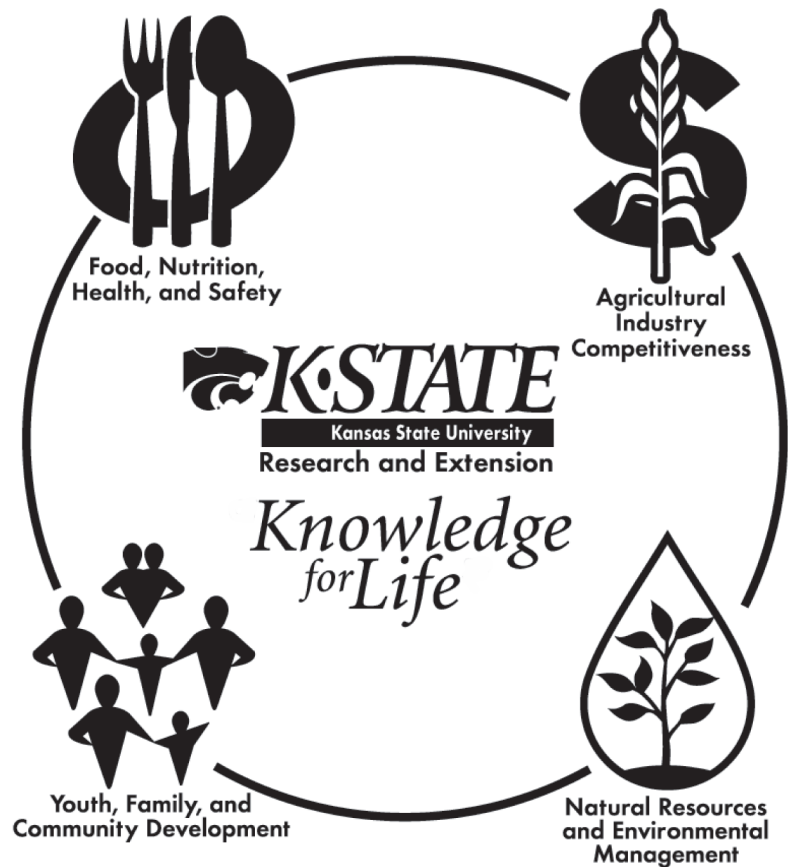
7. If a limb has been amputated, elevate it, apply direct pressure, and **e** .

8. The heaviest work should be done at the **a** part of the day.

9. Avoid **d** before working in the heat.

10. If you can hear **c** then you are able to be struck by lightning.

Notes



This publication is produced by K-State Research and Extension, Manhattan, Kansas, www.ksre.ksu.edu

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF 2710 rev.

April 2006

K-State Research and Extension is an equal opportunity provider and employer. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Fred A. Cholick, Director.