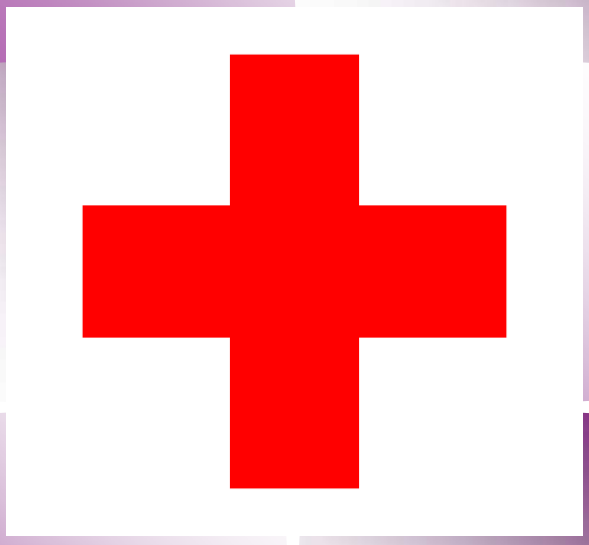
Lightning Bots
Team 2010

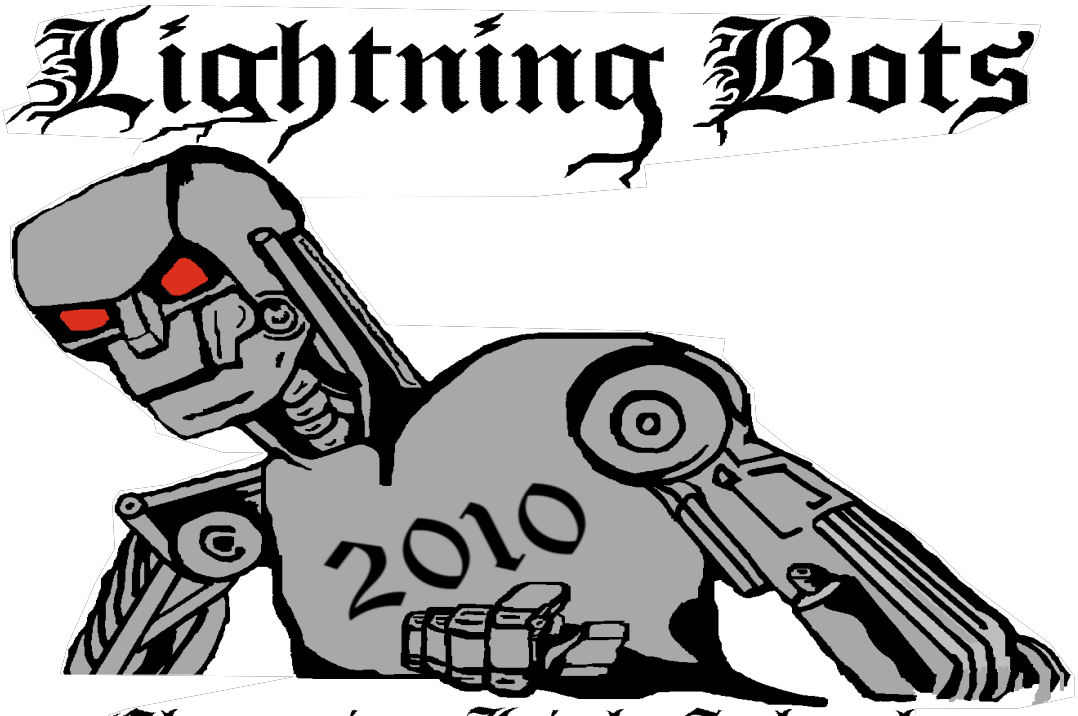


PRELIMINARY
Safety Manual

2010

Volume 3

2010 Safety Manual



Champion Robotics Team 2010:

The Lightning Bots

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Warren, Ohio 44483
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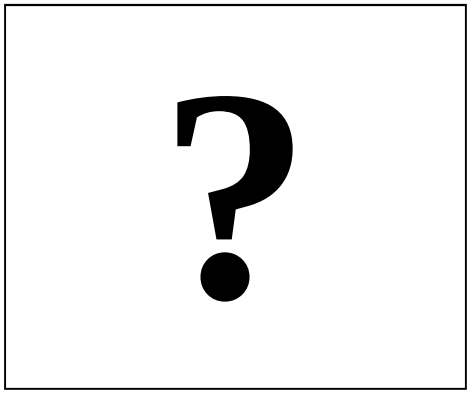
Table of Contents

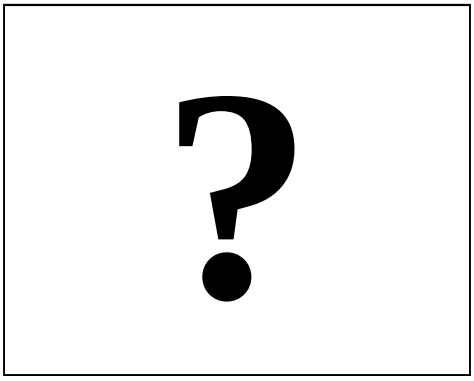
Keys For Establishing a Safe Environment During This Competition Season:

REMEMBER: *Safety is everyone's responsibility.*

This manual was created to help insure safe travel and a safe pit area. It is every member's responsibility to follow through with the information contained in this manual. If you have any questions, please ask a team teacher, mentor or the Safety Captain.



TO BE NAMED
Safety Captain



TO BE NAMED
Co-Safety Captain

About Underwriter Laboratories (UL)

Underwriters Laboratories logo

Underwriters Laboratories Inc. (UL) is an independent product safety certification organization that has been testing products and writing Standards for Safety for over a century. UL evaluates more than 19,000 types of products, components, materials and systems annually with 21 billion UL Marks appearing on 72,000 manufacturers' products each year. UL's worldwide family of companies and network of service providers includes 62 laboratory, testing and certification facilities serving customers in 99 countries.

This is the UL Recognized Component Mark .

UL does not “approve” products. Rather it evaluates products, components, materials and systems for compliance to specific requirements, and permits acceptable products to carry a UL certification mark, as long as they remain compliant with the standards. UL offers several categories of certification. Products under its listing service are said to be “UL Listed,” identified by the distinctive UL mark. In some cases, a component may be “UL Recognized,” meaning UL has found it acceptable for use in a complete UL Listed product. Other products may be “UL Classified” for specific hazards or properties. UL maintains a directory of more than 3 million products through a publicly available, online database.

General Shop Safety

*All students must pass **SAFETY TEST** before operating any equipment.*

- Safety glasses required at all times.
- Proper footwear is required (No open-toed shoes).
- NO HORSEPLAY! Avoid distracting machine operators.
- Do not use equipment without adult presence.
- Know where emergency switch is before using machine.
- Never leave a running machine unattended.
- Before operating machine, be sure you have received safe operating instructions.
- Make sure you have sufficient lighting while working on projects.
- Remove all hanging jewelry.
- Have long hair tied back or restrained.
- No headphones, ear buds, etc.
- Personal protection when necessary (i.e. gloves)
- Always be aware of your surroundings.
- Proper ventilation when needed (i.e. paint fumes).
- If something if not functioning properly immediately alert adult.
- Always know location of first aid kit, fire blanket and fire extinguisher
- Report all machine malfunctions to the supervising adult teacher, mentor or volunteer.
- Remember to use appropriate Lock-Out, Tag-Out procedures
- Use tools for intended use only!
- Report all damage to a mentor.
- Do NOT use machines that you do not know how to operate.

BAND SAW

- Know where on/off switch is before operating.
- Make sure blade is free from debris.
- Adjust blade guide to proper height.
- Make sure teeth on blade are in proper working condition.

MONARCH LATHE

- Know where on/off switch is before operating.
- Make sure guards are in place.
- Remove chuck key before starting.

HARDINGE LATHE

- Know where on/off switch is before operating.
- Remove chuck key before starting.

MILLING

- Know where on/off switch is before operating.
- Remove chuck key before starting

GRINDER/SANDER

- Know where on/off switch is before operating.
- Make sure the molder/drive belts are in good condition
- Check the sanding pads to see they are in working condition.

ARBOR PRESS

- Has no on/off switch.
- Be able to properly adjust.

CUT-OFF SAW

- Know where on/off switch is before operating.
- Make sure cutting blade is in good condition.
- Check to see if guards are in place and secure.
- Make sure that the clamp is secure.

TABLE SAW

- Make sure guard is in place
- Know where on/off switch is before operating.
- Make sure cutting blade is in good condition.

POWER-HAND TOOL

DRILL, GRINDER, CIRCULAR SAW, DREMEL

- Make sure power cord is not in the way.
- Check to see if the power cord is cut or damaged.
- Be aware of faulty equipment (over-heating).
- Listen for strange noises while operating equipment.

Competition Pit/Shop Rules

Always use common sense in the work area and pay attention at all times. We must work together to keep the pit areas neat and orderly to avoid injuries.

General Rules:

- **ALWAYS WEAR SAFETY GLASSES!!!**
- All paperwork should be kept in proper folders/binders.
- Keep all personal items out of the pit and place them in the stands.
- Keep all giveaways with your personal belongings in the stands.
- Keep all food and beverages labeled with your name. All unmarked items will be thrown away!!
- Throw away all trash, including broken robot parts.
- Return all tools to their proper place after using them.
- Don't stand around in the pit. Either have something to do or go somewhere else where help is needed.
- There is NO running in the pit or competition area.
- NO horseplay.
- Don't throw any tools or materials.

Traveling in Comfort

- Below are some important things to keep in mind as we travel to and from competitions. We will usually be traveling in cars and buses, which can sometimes be uncomfortable.
- If your feet do not reach the floor when you are seated, put your backpack on the floor and use it as a footrest to help eliminate a strained back.
- Use a suitcase with wheels to avoid carrying heavy luggage.
- Avoid staying seated for long periods of time. Get up and walk around every so often.
- Use both shoulder straps when carrying a backpack.
- Don't cross your legs, keep both of them firmly on the floor.
- When standing in line stand with your feet at shoulder width apart, hips forward, shoulders back, and head up.
- Always wear comfortable shoes with good support. Floppy boots, high heals or cheap sneakers can lead to foot, leg and back pain.
- During road trips make sure that the head rests are in their upright positions. It will help minimize whiplash if an accident should occur.

Personal Safety

- As recommended by FIRST always travel in pairs or larger groups at all times. Make sure to always include at least one adult during transportation.
- Don’t walk alone any time, especially at night.
- Don’t use headphones while walking.
- Always pay attention to your surroundings.
- Walk in well-lit areas.
- Stay away from shortcuts.
- After dark stay away from objects that someone could hide behind.
- Always walk near the curb.
- Do NOT approach a vehicle that stops to ask for directions.
- If you are being followed go to a well-lit area with people. If you need to turn around and walk in the opposite direction, they will also have to turn around. Use your cell phones.
- Do NOT display cash openly.
- Do NOT roam the hotel floors.

Lifting Safety

- Always ask for help when lifting things!
- Check the weight of the box before lifting it so you can prepare accordingly.
- Turn the body as a unit to avoid twisting at the waist.
- Keep the item close to your body.
- Keep your back straight.
- Use you legs to do the lifting.
- Lift smoothly without jerking.
- Get close to the area where you are going to set the item down before releasing it.

Battery Safety

CAUTION: Batteries contain acid. This substance, H_2SO_4, is a corrosive, colorless liquid that will burn your eyes, skin, and clothing. The team mentor and safety captain should post the Material Safety Data Sheet (MSDS) and train all team members about battery safety. You can find Emergency handling and first aid on the MSDS, proper protection for handling cracked or damaged batteries, and information on disposal of the battery.

General Damaged Battery Information/ Warnings

Any battery that is visibly damaged in any way is dangerous and unusable, and should be set aside and handled accordingly because:

1. It contains stored electrical energy that could cause the battery to rapidly heat up due to an internal electrical short circuit, and possibly explode.
2. The 12V batteries *FIRST* provided in your Kit contain sulfuric acid that will burn human tissue on contact.
   * *Immediately flush any contacted skin with a large quantity of water*
   * *Seek medical treatment*
   * *Periodically inspect your batteries for any signs of damage or leaking electrolyte. Remember that a dropped battery may be cracked, but the crack may not be visible and might eventually leak.*
   * *Treat it as a hazardous material and process it in accordance with the battery's MSDS.*

Necessary Safety Materials

FIRST recommends that teams keep the following items readily available whenever working with batteries:

1. A box of bicarbonate of soda to neutralize any exposed acid electrolyte.
2. A pair of acid-resistant rubber or plastic leak-proof gloves to wear when handling a leaking battery.
3. A suitable non-metallic leak-proof container in which to place the defective battery.

Procedure for Handling a Leaking Battery

When an electrolyte leak occurs:

- Neutralize it by pouring the bicarbonate of soda on all wetted surfaces. The bicarbonate of soda itself is not dangerous, and will react with the acid in the electrolyte leaving a safe residue that can be disposed of in a conventional manner such as rinsing with water.
- Put on the gloves before handling the battery.
- Place the battery in the leak-proof container for removal.
- Be sure to neutralize any acid on the gloves before removing and storing them.
- Follow emergency handling instructions of the MSDS, and notify mentor.
- Seek medical attention.
- Properly dispose of the battery, which is now a hazardous material.

At a *FIRST* event:

- Immediately send the person in contact with acid to the First Aid Station/EMTs
- Report incident to the Pit Administration Supervisor so he/she can fill out an Incident Report. Provide team number and available information.
- Obtain sodium bicarbonate from the Pit Administration Supervisor and carefully sprinkle the sodium bicarbonate on the spill, then clean it and dispose of the now neutralized cleanup materials in the trash.
- Dispose of the battery properly. Read below.

Battery Disposal:

The Interstate Batteries Company http://www.interstatebatteries.com has volunteered to accept and properly dispose of any *FIRST* team's batteries, and you can find a location near you from the above web site.
Most retailers of automotive batteries will accept and properly dispose of them at no cost.

Charging and Handling:

- When a battery is neither connected to the robot nor the battery charger, use the battery protector safety plugs *FIRST* provides in the Kit of Parts.
- Keep the battery charging area clean and orderly.
- Place your battery charger in an area where cooling air can freely circulate around the charger. Battery chargers can fail without proper ventilation.
- Do not short out the battery terminals. If metal tools/parts contact the terminals simultaneously, it will create a direct short circuit. This may cause high heat to develop in the battery terminal/part/tool area and the battery could explode.
- If a quick disconnect is not available and you must use tools to disconnect the battery, make sure metal tools don’t contact both terminals at the same time.

Ongoing Battery Inspection:

- Periodically inspect your battery for any evidence of damage, such as a cracked case or leaking electrolyte.
- Bent terminals can also be a potential leak source.
- After each competition round, inspect the battery.
- Check your battery prior to competing in each round.

RESPECT OF ELECTRICITY

Proper use and respect for electricity is essential . The following are general guidelines for ensuring basic electrical safety requirements are met:

- Inspect your equipment cords and extension cords routinely to ensure they are in good condition.
- DO NOT overload electrical fixtures and/or receptacles.
- Avoid the following electrical / power supply setups to prevent overloading.
- Power strip plugged into another power strip.
- Extension cord plugged into another extension cord.
- Extension cord plugged into a power strip.
- Multi-device receptacle plugged into a power strip or extension cord.

FIRE EXTINGUISHER INFORMATION:

There are four different types of fire extinguishers, each which is used on specific fires. Newer fire extinguishers use a picture/ labeling system to designate which types of fire they are used on. Older ones use geometrical shapes with letters.

Fire Extinguisher Ratings:

Class A Extinguishers will put out fires in ordinary combustibles, such as wood and paper. The numerical rating for this class of fire extinguisher refers to the amount of water the fire extinguisher holds and the amount of fire it will extinguish.

Class B Extinguishers should be used on fires involving flammable liquids, such as grease, gasoline, oil, etc. The numerical rating for this class of fire extinguisher states the approximate number of square feet of a flammable liquid fire that a non-expert person can expect to extinguish.

Class C Extinguishers are suitable for use on electrically energized fires. This class of fire extinguishers does not have a numerical rating. The presence of the letter "C" indicates that the extinguishing agent is non-conductive.

Class D Extinguishers are designed for use on flammable metals and are often specific for the type of metal in question. There is no picture designator for Class D extinguishers . These extinguishers generally have no rating nor are they given a multi-purpose rating for use on other types of fires.

Different Types of Extinguishers

Dry Chemical extinguishers are rated for multiple purpose use. They contain an extinguishing agent and use compressed, nonflammable gas as a propellant.

Carbon Dioxide (CO_2) extinguishers are most effective on Class B and C (liquids and electrical) fires.

Halon extinguishers contain a gas that interrupts the chemical reaction that takes place when fuels burn. The initial layer of Halon should be made at the base of the fire, even after the flames have been extinguished.

Water extinguishers contain water and compressed gas and should only be used on Class A (ordinary combustibles) fires. Since the fire could re-ignite, continue to apply the agent even after the fire appears to be out.

Material Safety Data Sheet

May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. This Standard must be
consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration

(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(As Used on Label and List)* **Section I**	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section II - Hazard Ingredients/Identity Information

Manufacturer's Name	Emergency Telephone Number
Address *(Number, Street, City, State, and ZIP Code)*	Telephone Number for Information
	Date Prepared
	Signature of Preparer *(optional)*

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV		% *(optional)*

Section III - Physical/Chemical Characteristics

		Specific Gravity (H_2O = 1)	
Vapor Pressure (mm Hg.)		Melting Point	
Vapor Density (AIR = 1)		Evaporation Rate (Butyl Acetate = 1)	
Solubility in Water			
Appearance and Odor			

Vapor Pressure: *Vapor pressure (VP) can be used as a measure of how volatile a substance is., or how quickly it evaporates. VP is measured in units of millimeters of mercury (mm Hg). For comparison, the VP of water (at 20^o Centigrade) is 17.5 mm Hg. The VP of Vaseline (a nonvolatile substance) would be close to zero mm Hg, while the VP of diethyl ether (a very volatile substance) is 440 mm Hg.*

Vapor Density: *This figure tells whether the vapor is lighter or heavier than air. The density of air is 1.0. A density greater than 1.0 indicates a heavier vapor, a density less than 1.0 indicates lighter vapor. Vapors heavier than air (gasoline vapor for instance) can flow along just above the ground and can collect in depressions where they may pose a fire and explosion hazard.*

Specific Gravity: *This figure tells whether the liquid is lighter or heavier than water. Water has a density of 1.0.*

Percent Volatile by Volume: *Tells how much of the substance will evaporate away.*

Section IV - Fire and Explosion Hazard Data

	Flammable Limits	LEL	UEL
Extinguishing Media			
Special Fire Fighting Procedures			
Unusual Fire and Explosion Hazards			

Flash Point: This is the lowest temperature at which a liquid gives off enough vapor to ignite when a source of ignition is present. At or above this temperature, a fire or explosion hazard may exist if the substance is used in the presence of spark or flame.

Flammable Limits: In order to be flammable, a substance must be mixed with a certain amount of air (as in an automobile carburetor). A mixture that is too "lean" (not enough chemical) or too "rich" (not enough air) will not ignite. The Lower Explosive Limit (LEL) and the Upper Explosive Limit (UEL) define the range of concentration in which combustion can occur.

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable		
Incompatibility *(Materials to Avoid)*			
Hazardous Decomposition or Byproducts			
Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur		

Section VI - Health Hazard Data

	Inhalation?	Skin?	Ingestion?
Health Hazards *(Acute and Chronic)*			
Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
Signs and Symptoms of Exposure			
Medical Conditions Generally Aggravated by Exposure			
Emergency and First Aid Procedures			

Use of Tools:

- Always use the tool for its intended use ONLY!!
- Don’t distract anyone while they are operating machinery.
- Use a vice or clamp to hold your work.
- Don’t use anything if you don’t know how.
- Always keep tools in their proper place when not in use.
- Always report damaged tools to a mentor or the Safety Captain.

Use of Machines:

- Always wear safety goggles.
- Tuck in all loose clothing.
- Tie back long hair.
- Do not wear jewelry while operating any machine.
- Make sure all safety guards are in place.
- Know the position of the emergency stop of the machine.
- NEVER lean on or touch a running machine.
- NEVER leave a machine running and unattended.
- Clean up your area when you are finished.

Sharp pointed objects

- Use extra caution when dealing with sharp object to help avoid unnecessary accidents.
- Store all pointed objects in separate containers.
- When carrying any pointed object, place the object in your palm with the pointed end away from you. Use extra caution when walking up and down stairs.
- Never carry a pen in your mouth.
- When handing someone a sharp object always hand them the handle first.

Footwear

Sandals and opened toe shoes are **PROHIBITED**. Wear shoes that completely cover and protect your feet.

* Refer to the First-Aid section if you should develop a blister.

Eye Protection-MANDATORY SAFETY GLASSES

FIRST requires everyone including guests to wear safety glasses at all times including:

- Unloading the robot from the crate
- Working on the robot
- Watching the robot being repaired
- Competing
- At all times when you are in the pit area.

You do not have to wear safety glasses if you are watching the competition from the stands. However if you are watching it from the pit area you are required to wear them.

* All drivers, human players and coaches will not be allowed on the playing field if they don't have safety glasses on.
** Under certain conditions, you must wear safety glasses on top of regular glasses even if they have side shields on them.

No Forehead Protectors

DO NOT wear your safety goggles on your forehead! They were made to go on your eyes.

If you want to protect your head buy a safety helmet.

Ear Protection

People differ in their sensitivity to noise. As a general rule, noise may damage your hearing if you have to shout over background noise to make yourself heard, the noise hurts your ears, it makes your ears ring, or you have difficulty hearing for several hours after exposure to the noise.

Hearing protection devices decrease the intensity of sound that reaches the eardrum. They come in two forms: earplugs and earmuffs.

Earplugs are small inserts that fit into the outer ear canal

Earmuffs fit over the entire outer ear to form an air seal so the entire circumference of the ear canal is blocked, and they are held in place by an adjustable band. Earmuffs will not seal around eyeglasses or long hair

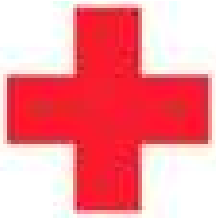
First Aid

If you or someone else gets injured tell someone ASAP.

This section is dedicated to incidents that would require first aid. The following pages are provided as quick reference. This information was acquired from: http://www.mayoclinic.com

*NOTE:
This information is not intended as substitute for professional medical advice, emergency treatment or formal first-aid training. Don't use this information to diagnose or develop a treatment plan for a health problem or disease without consulting a qualified health care provider. If you're in a life-threatening or emergency medical situation, seek medical assistance immediately.

Anaphylaxis



A severe allergic reaction (anaphylaxis) can produce shock and life-threatening respiratory distress. In sensitive people, anaphylaxis can occur within minutes or up to several hours after exposure to a specific allergy-causing substance. Almost any allergy-causing substance — including insect venom, pollen, latex, certain foods and drugs — can cause anaphylaxis. Some people have anaphylactic reactions from unknown causes.

If you're extremely sensitive, you might break out in hives, and your eyes or lips might swell severely. The inside of your throat might swell as well, even to the point of causing difficulty breathing and shock. Dizziness, mental confusion, abdominal cramping, nausea, vomiting or diarrhea also may accompany anaphylaxis.

If you've had an anaphylactic reaction in the past, carry medications with you as an antidote. Epinephrine is the most commonly used drug for severe allergic reactions. It comes only as an injection that must be prescribed by your doctor. You should also carry an antihistamine pill, such as diphenhydramine (Benadryl, others), because the effects of epinephrine are only temporary. Seek emergency medical attention immediately after taking these medications.

If you observe someone having an allergic reaction with signs of anaphylaxis:

1. Call 911 or your local medical emergency number.

2. Check for special medications that the person might be carrying to treat an allergic attack, such as an auto-injector of epinephrine (for example, EpiPen).

3. Have the person lie still on his or her back with feet higher than the head.

4. If there's vomiting or bleeding from the mouth, turn the person on his or her side to prevent choking.

If there are no signs of circulation (breathing, coughing or movement), begin CPR.

Blisters

Common causes of blisters include friction and burns. If the blister isn't too painful, do everything possible to keep it intact. Unbroken skin over a blister provides a natural barrier to bacteria and decreases the risk of infection. Cover the blister with a small adhesive bandage to protect it.

If the blister is painful, drain the fluid while leaving the overlying skin intact. Here's how:

- Wash your hands and the blister with warm water and soap.
- Swab the blister with rubbing alcohol.
- Sterilize a clean, sharp needle by wiping it with rubbing alcohol.
- Use the needle to puncture the blister. Aim for several spots near the blister's edge. Let the fluid drain, but leave the overlying skin in place.
- Apply an antibiotic ointment to the blister and cover with a bandage.
- Use tweezers and scissors sterilized with rubbing alcohol to cut away all the dead skin after several days. Apply more ointment.

Call your doctor if you see signs of infection around a blister — pus, redness, increasing pain or warm skin.

To prevent a blister, use gloves, socks, a bandage or similar protective covering over the area being rubbed. Special athletic socks that have extra padding in critical areas are available. You might also try attaching moleskin to the inside of your shoes where it might rub, such as your heels.

Remember the following when you shop for shoes:

- Shop during the middle of the day. Your feet swell throughout the day, so a midday fitting will probably give you the best fit.
- Measure your feet. Shoe sizes change throughout adulthood.
- Measure both feet and try on both shoes. If your feet differ in size, buy the larger size.
- Go for flexible but supportive shoes with cushioned insoles.
- Be sure that you can comfortably wiggle your toes.

Bruise

A bruise forms when a blow breaks small blood vessels near your skin's surface, allowing a small amount of blood to leak out under your skin. The trapped blood appears as a black-and-blue mark. Sometimes, there also are tiny red dots or red splotches.

If your skin isn't broken, you don't need a bandage. You can, however, enhance healing with these simple techniques:

- Elevate the injured area.
- Apply ice or a cold pack for 30 to 60 minutes at a time for a day or two after the injury.

See your doctor if:

- You have unusually large or painful bruises — particularly if your bruises seem to develop for no known reasons.
- You bruise easily and you're experiencing abnormal bleeding elsewhere, such as from your nose or gums, or you notice blood in your eyes or your urine. You have no history of bruising but suddenly experience bruises.

These signs and symptoms may indicate a more serious problem, such as a blood-clotting problem or blood-related disease. Bruises accompanied by persistent pain or headache also may indicate a more serious underlying illness and require medical attention.

Burns

To distinguish a minor burn from a serious burn, the first step is to determine the degree and the extent of damage to body tissues. These three classifications will help you determine emergency care:

First-degree

The least serious burns are those in which only the outer layer of skin (epidermis) is burned. The skin is usually red, with swelling and pain sometimes present. The outer layer of skin hasn't been burned through. Treat a first-degree burn as a minor burn unless it involves substantial portions of the hands, feet, face, groin or buttocks or a major joint.

Second-degree

When the first layer of skin has been burned through and the second layer of skin (dermis) also is burned, the injury is termed second-degree burn. Blisters develop and the skin takes on an intensely reddened, splotchy appearance. Second-degree burns produce severe pain and swelling.

If the second-degree burn is no larger than 2 to 3 inches in diameter, treat it as a minor burn. If the burned area is larger or if the burn is on the hands, feet, face, groin or buttocks or over a major joint, get medical help immediately.

For minor burns, including second-degree burns limited to an area no larger than 2 to 3 inches in diameter, take the following action:

- **Cool the burn.** Hold the burned area under cold running water for 15 minutes. If this is impractical, immerse the burn in cold water or cool it with cold compresses. Cooling the burn reduces swelling by conducting heat away from the skin. Don't put ice on the burn.
- **Consider a lotion.** Once a burn is completely cooled, applying an aloe Vera lotion, a triple antibiotic ointment or a moisturizer prevents drying and makes you feel more comfortable.

- **Cover the burn with a sterile gauze bandage.** Don't use fluffy cotton, which may irritate the skin. Wrap the gauze loosely to avoid putting pressure on burned skin. Bandaging keeps air off the area, reduces pain and protects blistered skin.
- **Take an over-the-counter pain reliever.** These include aspirin, ibuprofen (Advil, Motrin, others), naproxen (Aleve) or acetaminophen (Tylenol, others). Minor burns usually heal in about one to two weeks without further treatment. They may heal with pigment changes, meaning the healed area may be a different color from the surrounding skin. Watch for signs of infection such as increased pain, redness, fever, swelling or oozing. If infection develops, seek medical help. Avoid re-injuring or tanning if the burns are less than a year old — doing so may cause more extensive pigmentation changes. Use sunscreen on the area for at least a year.

Caution

- **Don't use ice.** Putting ice directly on a burn can cause frostbite, further damaging your skin.
- **Don't break blisters.** Fluid-filled blisters protect against infection. If blisters break, wash the area with mild soap and water, then apply an antibiotic ointment and a gauze bandage. Clean and change dressings daily. Antibiotic ointments don't make the burn heal faster, but they can discourage infection. Certain ingredients in some ointments can cause a mild rash in some people. If a rash appears, stop using the ointment. If it's a major burn, don't apply any ointment at all (see below).

Third-degree

The most serious burns are painless and involve all layers of the skin. Fat, muscle and even bone may be affected. Areas may be charred black or appear dry and white. Difficulty inhaling and exhaling, carbon monoxide poisoning or other toxic effects may occur if smoke inhalation accompanies the burn.

For major Burns dial 911 or call for emergency medical assistance. Until an emergency unit arrives, follow these steps:

Don't remove burnt clothing. However, do make sure the victim is no longer in contact with smoldering materials or exposed to smoke or heat.

Make sure the burn victim is breathing. If breathing has stopped or you suspect the person's airway is blocked, try to clear the airway and, if necessary, do cardiopulmonary resuscitation (CPR).

Cover the area of the burn. Use a cool, moist sterile bandage or clean cloth.

Choking

In adults, choking is often the result of inadequately chewed food becoming lodged in the throat or windpipe. Solid foods such as meat are frequently the cause.

These factors increase the risk of choking:

- Talking while simultaneously chewing a piece of meat.
- Drinking alcohol while eating.
- Wearing dentures. Because dentures exert less chewing pressure than natural teeth and they interfere with the way food feels in the mouth, they make it more difficult to thoroughly chew food.

Young children tend to put into their mouths almost anything that fits, so choking can occur unassociated with a meal.

Panic accompanies choking. The choking victim's face often assumes an expression of fear or terror. At first the victim may turn purple, the eyes may bulge, and he or she may wheeze or gasp.

If the person can cough freely, has normal skin color and can speak, he or she is not choking. If the cough is more like a gasp and the person is turning blue, he or she is probably choking. If in doubt, ask the choking person if he or she can talk. If the person can speak, then the windpipe is not completely blocked and oxygen is reaching the lungs. If choking is occurring, begin to perform the Heimlich maneuver.

To perform the Heimlich maneuver on someone else:

- Stand behind the choking person and wrap your arms around his or her waist. Bend the person slightly forward.
- Make a fist with one hand and place it slightly above the person's navel.
- Grasp your fist with the other hand and press hard into the abdomen with a quick, upward thrust. Repeat this procedure until the object is expelled from the airway.

To perform the Heimlich maneuver on yourself:

- Position your own fist slightly above your navel.
- Grasp your fist with your other hand and bend over a hard surface — a countertop or chair will do.
- Shove your fist inward and upward.

Clearing the airway of a pregnant woman or obese person:

- Position your hands a little bit higher than with a normal Heimlich maneuver, at the base of the breastbone, just above the joining of the lowest ribs.
- Proceed as with the Heimlich maneuver, pressing hard into the chest, with a quick thrust.
- Repeat until the food or other blockage is dislodged or the person becomes unconscious.

Clearing the airway of an unconscious person:

- Position the person on his or her back, look inside the mouth and sweep the area with your finger to see if you can remove the blockage.
- If not, kneel over the person and apply upward thrusts to the upper abdomen.
- Repeat the process as necessary. Look inside the mouth again and sweep the area with your finger to try to remove the blockage. Then kneel over the person and apply upward thrusts to the upper abdomen.

Clearing the airway of a choking infant:

- Assume a seated position and hold the infant facedown on your forearm, which is resting on your thigh.
- Thump the infant gently but firmly five times on the middle of the back using the heel of your hand. The combination of gravity and the back blows should release the blocking object.
- If this doesn't work, hold the infant face up on your forearm with the head lower than the trunk. Using two fingers placed at the center of the infant's breastbone, give five quick chest compressions.
- If breathing doesn't resume, repeat the back blows and chest thrusts. Call for emergency medical help.

If one of these techniques opens the airway but the infant doesn't resume breathing, begin mouth-to-mouth resuscitation

The universal sign for choking is a hand clutched to the throat, with thumb and fingers extended. If a person displays this sign, dial 911 or call for emergency medical assistance. Don't leave the person unattended.
If some food "goes down the wrong pipe," the coughing reflex often will resolve the problem. If it doesn't, you'll need to help the victim remove the airway obstruction.
To prepare yourself for such situations, learn the Heimlich maneuver in a certified first-aid training course.

Corneal abrasion (scratch)

The most common types of eye injury involve the cornea — the clear, protective "window" at the front of the eye. Contact with dust, dirt, sand, wood shavings, metal particles or even an edge of a piece of paper can scratch or cut the cornea. Usually the scratch is superficial, and this is called a corneal abrasion. Some corneal abrasions become infected and result in a corneal ulcer, which is a serious problem.

Everyday activities can lead to corneal abrasions. Examples are playing sports, doing home repairs or being scratched by children who accidentally brush your cornea with a fingernail. Other common injuries to the cornea include splash accidents — contact with chemicals ranging from antifreeze to household cleaners.

Because the cornea is extremely sensitive, abrasions can be painful. If your cornea is scratched, you might feel like you have sand in your eye. Tears, blurred vision, increased sensitivity or redness around the eye can suggest a corneal abrasion.

In case of injury, seek prompt medical attention. Other immediate steps you can take are to:

- **Use water to rinse the eye**. Run lukewarm tap water over the eye or splash the eye with clean water. Many work sites have eye-rinse stations for this purpose. Rinsing the eye may wash out the offending foreign body.
- **Blink several times.** This movement may remove small particles of dust or sand.
- **Pull the upper eyelid over the lower eyelid.** The lashes of the lower eyelid can brush the foreign body from the undersurface of the upper eyelid.

Take caution to avoid certain actions that may aggravate the injury:

- **Don't apply patches or ice packs to the eye**. If you do get an object in the eye itself — typically when hammering metal on metal — do not press on the eyeball.

Don't rub your eye after an injury. This action can worsen a corneal abrasion.

Cuts and scrapes

Minor cuts and scrapes usually don't require a trip to the emergency room. Yet proper care is essential to avoid infection or other complications. These guidelines can help you care for simple wounds:

Stop the bleeding. Minor cuts and scrapes usually stop bleeding on their own. If they don't, apply gentle pressure with a clean cloth or bandage. Hold the pressure continuously for 20 to 30 minutes. Don't keep checking to see if the bleeding has stopped because this may damage the fresh clot that's forming and cause bleeding to resume. If the blood spurts or continues to flow after continuous pressure, seek medical assistance.

Clean the wound. Rinse out the wound with clear water. Soap can irritate the wound, so try to keep it out of the actual wound. If dirt or debris remains in the wound after washing, use tweezers cleaned with alcohol to remove the particles. If debris remains embedded in the wound after cleaning, see your doctor. Thorough wound cleaning reduces the risk of tetanus. To clean the area around the wound, use soap and a washcloth. There's no need to use hydrogen peroxide, iodine or an iodine-containing cleanser. These substances irritate living cells. If you choose to use them, don't apply them directly on the wound.

Apply an antibiotic. After you clean the wound, apply a thin layer of an antibiotic cream or ointment such as Neosporin or Polysporin to help keep the surface moist. The products don't make the wound heal faster, but they can discourage infection and allow your body's healing process to close the wound more efficiently. Certain ingredients in some ointments can cause a mild rash in some people. If a rash appears, stop using the ointment.

Cover the wound. Exposure to air speeds healing, but bandages can help keep the wound clean and keep harmful bacteria out.

- **Change the dressing**. Change the dressing at least daily or whenever it becomes wet or dirty. If you're allergic to the adhesive used in most bandages, switch to adhesive-free dressings or sterile gauze held in place with paper tape, gauze roll or a loosely applied elastic bandage. These supplies generally are available at pharmacies.
- **Get stitches for deep wounds**. A wound that cuts deeply through the skin or is gaping or jagged-edged and has fat or muscle protruding may require stitches. A strip or two of surgical tape may hold a minor cut together, but if you can't easily close the mouth of the wound, see your doctor. Proper closure minimizes scarring and infection.
- **Watch for signs of infection**. See your doctor if the wound isn't healing or you notice any redness, drainage, warmth or swelling.

Get a tetanus shot. Doctors recommend you get a tetanus shot every 10 years. If your wound is deep or dirty and your last shot was more than five years ago, your doctor may recommend a tetanus shot booster. Get the booster within 48 hours of the injury.

Fainting

Fainting occurs when the blood supply to your brain is momentarily inadequate, causing you to lose consciousness. The loss of consciousness is usually brief. Fainting can have no medical significance, or the cause can be a serious disorder. Therefore, treat loss of consciousness as a medical emergency until the signs and symptoms are relieved and the cause is known.

If you feel faint:

- Lie down or sit down.
- If you sit down, place your head between your knees.

Discuss recurrent fainting spells with your doctor.

If someone else faints:

Position the person on his or her back. Make sure the legs are elevated above the heart level.

Watch the airway carefully. People who lose consciousness may vomit.

Check for breathing. Position your ear over the person's mouth to listen for breathing sounds. If breathing has stopped, the problem is more serious than a fainting spell. Initiate cardiopulmonary resuscitation (CPR). Get emergency medical care. Call 911.

Help restore blood flow. If the person is breathing, restore blood flow to the brain by raising the person's legs above the level of the head. Loosen belts, collars or other constrictive clothing. The person should revive quickly. If the person doesn't regain consciousness in 1 to 2 minutes, dial 911 or call for emergency medical assistance.

If the person was injured in a fall associated with a faint, treat any bumps, bruises or cuts appropriately. Control bleeding with direct pressure.

Foreign object in eye

If you get a foreign object in your eye:

Try to flush the eye clear. Using an eyecup or small, clean glass, wash your eye with clean water. Position the glass with its rim resting on the bone at the base of your eye socket and pour the water in, keeping your eye open.

If you can't clear your eye, seek emergency medical assistance.

To help someone else who has a foreign object in the eye:

Wash your hands. Don't rub the eye. Seat the person in a well-lighted area.

Try to locate the object in the eye visually. Examine the eye by gently pulling the lower lid downward and instructing the person to look upward. Reverse the procedure for the upper lid. Hold the upper lid and examine the eye while the person looks downward. If you find that the foreign object is embedded in the eyeball, cover the person's eye with a sterile pad or a clean cloth. Don't try to remove the object.

If the object is large and makes closing the eye difficult, cover the eye and the object with a paper cup. Don't remove the object. Seek emergency medical assistance.

If the object is floating in the tear film or on the surface of the eye, you may be able to flush it out or remove it manually. While holding the upper or lower lid open, use a moistened cotton swab or the corner of a clean cloth to remove the object by lightly touching it. If you can't remove the object easily, cover both eyes with a soft cloth and seek emergency medical assistance.

If you do remove the object, flush the eye with a saline solution or lukewarm water.

If pain, vision problems or redness persists, seek emergency medical assistance.

Foreign object in skin

Use tweezers to remove slivers of wood or fiberglass, small pieces of glass or other foreign objects projecting from your skin. Clean the area well with soap and water and apply alcohol to the wound.

If the object is completely embedded in your skin:

- Clean the area well with soap and water.
- Sterilize a needle by holding it in a flame for a few seconds.
- Break the skin over the object with the needle.
- Use tweezers to remove the object. A magnifying glass may help you see the object better.
- Apply antibiotic ointment to the area.

If the particles don't come out easily, seek medical help

Head Pain

Most headaches are minor, and you can treat them with a pain reliever. Some headaches, however, signal a dangerous or serious medical problem. Don't ignore an unexplained headache or one that steadily worsens. Get medical attention right away if your headache:

- Strikes suddenly and severely
- Accompanies a fever, stiff neck, rash, mental confusion, seizures, changes in vision, dizziness, weakness, loss of balance, numbness or difficulty speaking
- Is severe and follows a recent sore throat or respiratory infection
- Worsens after a head injury, fall or bump
- Is a new pain, and you're older than age 55
- Persists for several days

Head Trauma

Most head injuries are minor and don't require hospitalization. However, dial 911 or call for emergency medical assistance if any of the following signs are apparent:

- Severe head or facial bleeding
- Change in level of consciousness, even if temporary
- Black-and-blue discoloration below the eyes or behind the ears
- Cessation of breathing
- Confusion
- Loss of balance
- Weakness or an inability to use an arm or leg

If a severe head injury occurs:

- Until medical help arrives, keep the person who sustained the injury lying down and quiet in a darkened room, with the head and shoulders slightly elevated. Avoid moving the person's neck.
- Stop any bleeding with gauze or a clean cloth.

Observe the person for as long as necessary to be sure the level of consciousness doesn't change.

If the person stops breathing, do mouth-to-mouth rescue breathing in order to ventilate the person's lungs to supply oxygen to the blood in the lungs. At this point, there is no need to do chest compression if the person's heart is still beating. Avoid moving the person's head and neck when doing rescue breathing by lifting the jaw forward on both sides, and then give breaths at the rate of 10 to 12 per minute.

Puncture Wounds

A puncture wound doesn't usually cause excessive bleeding. Often there's little bleeding, and the wound seems to close almost instantly. But these features don't mean treatment isn't necessary, though.

A puncture wound — such as from stepping on a nail or being stuck with a tack — can be dangerous because of the risk of infection. The object that caused the wound may carry spores of tetanus or other bacteria, especially if the object had been exposed to the soil. Puncture wounds resulting from human or animal bites, including those of domestic dogs and cats, may be especially prone to infection. If the bite was deep enough to draw blood and the bleeding persists, seek medical attention. Otherwise, follow these steps:

Stop the bleeding. Minor cuts and scrapes usually stop bleeding on their own. If they don't, apply gentle pressure with a clean cloth or bandage. If bleeding persists — if the blood spurts or continues to flow after several minutes of pressure — seek emergency assistance.

Clean the wound. Rinse the wound well with clear water. A tweezers cleaned with alcohol may be used to remove small, superficial particles. If larger debris still remains more deeply embedded in the wound, see your doctor. Thorough wound cleaning reduces the risk of tetanus. To clean the area around the wound, use soap and a washcloth. You can also use hydrogen peroxide, iodine or an iodine-containing cleanser, but these substances are irritating to living cells. Don't apply them directly to the wound itself.

Apply an antibiotic. After you clean the wound, apply a thin layer of an antibiotic cream or ointment (Neosporin, Polysporin) to help keep the surface moist. These products don't make the wound heal faster, but they can discourage infection and allow your body's healing factors to close the wound more efficiently. Certain ingredients in some ointments can cause a mild rash in some people. If a rash appears, stop using the ointment.

Cover the wound. Exposure to air speeds healing, but bandages can help keep the wound clean and keep harmful bacteria out.

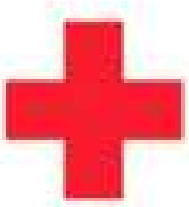
Change the dressing regularly. Do so at least daily or whenever it becomes wet or dirty. If you're allergic to the adhesive used in most bandages, switch to adhesive-free dressings or sterile gauze and hypoallergenic paper tape, which doesn't cause allergic reactions. These supplies are generally available at pharmacies.

Watch for signs of infection. See your doctor if the wound doesn't heal or if you notice any redness, drainage, warmth or swelling.

If the puncture is deep, contaminated or the result of an animal or human bite, see your doctor. He or she will evaluate the wound, clean it and, if possible, close it. If you haven't had a tetanus shot within 5 years, your doctor may recommend a booster. In this case you should have the booster within 48 hours of the injury.

If an animal — especially a stray dog or a wild animal — inflicted the wound, you may have been exposed to rabies. Your doctor may give you antibiotics and suggest initiation of a rabies vaccination series. Report such incidents to county public health officials. In addition, the animal should be confined for 10 days of observation by a veterinarian

Sprain



Your ligaments are tough, elastic-like bands that attach to your bones and hold your joints in place. A sprain is an injury to a ligament caused by excessive stretching. The ligament can have tears in it, or it can be completely torn apart.

Sprains occur most often in your ankles, knees or the arches of your feet. Sprained ligaments swell rapidly and are painful. For most minor sprains, you can probably treat the injury yourself.

Follow the instructions for P.R.I.C.E.

Protect the injured limb from further injury by not using the joint. You can do this using anything from splints to crutches.

Rest the injured limb. But don't avoid all activity. Even with an ankle sprain, you can usually still exercise other muscles to prevent deconditioning. For example, you can use an exercise bicycle, working both your arms and the uninjured leg while resting the injured ankle on the bike peg. That way you still get three-limb exercise to keep up your cardiovascular conditioning.

Ice the area. Using a cold pack, a slush bath or a compression sleeve filled with cold water all limit swelling after an injury. Try to apply ice as soon as possible after the injury. If you use ice, be careful not to use it for too long as this could cause tissue damage.

Compress the area with an elastic wrap or bandage. Compressive wraps or sleeves made from elastic or neoprene are best.

Elevate the injured limb whenever possible to help prevent or limit swelling.

Call for emergency medical assistance if:

- You heard a popping sound when your joint was injured or you can't use the joint. This may mean the ligament was completely torn apart. On the way to the doctor, apply a cold pack.
- You have a fever, and the area is red and hot. You may have an infection.
- You have a severe sprain. Inadequate or delayed treatment may cause long-term joint instability or chronic pain.
- You aren't improving after the first two or three days

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