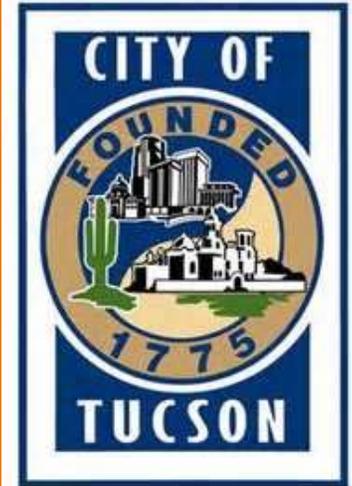


HHW PROGRAM VOLUNTEER



SAFETY AWARENESS TRAINING



Presented by
(trainer name)





HOUSEHOLD HAZARDOUS WASTE PROGRAM OVERVIEW

- City of Tucson/Pima County Household Hazardous Waste Program
 - Started in 1986 as a community-based committee partnered with the City of Tucson, Pima County and the University of Arizona to provide a two-day outreach to collect Household Hazardous Waste (HHW).
 - In 1989 the City and County entered into an intergovernmental agreement for the purpose of establishing a safe and cost-effective alternative for the disposal of HHW, as well as to develop an outreach and education program.
 - The main “Sweetwater” facility opened in 1990 under the direction of the Pima County Wastewater Management Department and initially had one employee with most other tasks completed by volunteers.
 - Today it is managed by the City of Tucson Department of Environmental Services and continues to utilize both staff and volunteers to reduce the volume of toxic materials entering our landfills, sewers, air and desert surroundings, and reduce community exposure to toxic materials.

HHWP ORGANIZATION



- The HHW Program is operated by the City of Tucson Department of Environmental Services.
- Day-to-day HHW Program operations throughout the city and county are the responsibility of the Program Coordinator.
- The HHW Program Steering Committee provides oversight and direction for the Program's activities.
 - It is comprised of seven members representing professional, business and government arenas, acting in an advisory capacity to the Director of Department of Environmental Services.

HHWP OBJECTIVES



- The main objectives of the HHW Program are to alleviate problems that can pose serious threats to human health and the environment by:
 - Protecting children's health by minimizing potential home exposure;
 - Protecting Pima County's ability to effectively treat wastewater;
 - Protecting solid waste workers' health;
 - Conserving valuable landfill space; and
 - Safeguarding groundwater from potential leaching of contaminants.

HHWP MISSION

- The mission of the HHW Program is to prevent hazardous materials from entering the environment locally and at the point of recycling, reclamation, treatment, or disposal.
- This mission is accomplished by two major steps:
 - Removing the materials from circulation through frequent collection periods, and
 - Educating the community about the potential impacts of household hazardous materials.



VOLUNTEER QUALIFICATIONS

- As a HHW Program Volunteer you do not need to have any previous experience or training.
- You must be at least 18 years old.
- During collection events, you may be:
 - Required to stand for long periods of time,
 - Required to lift items such as from the trucks of cars and placing them on a cart, and
 - Exposed to a variety of weather conditions, including extreme heat, cold and sudden rainstorms.
- You must be comfortable working with hazardous materials such as pesticides, solvents, pool acids, motor oil and antifreeze.

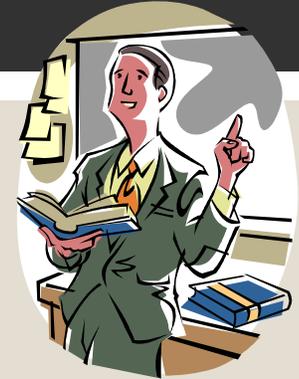


VOLUNTEER TIME COMMITMENT

- Volunteers must commit to working a minimum of four hours per calendar year.
 - This is addition to completing initial and annual training.
- If a volunteer fails to meet the time and training requirements, the volunteer will be placed on inactive status.
- After three years of inactive status, a volunteer will be dropped from the volunteer rolls.



VOLUNTEER TRAINING



■ Initial Training

- All new volunteers are required to complete the initial training and successfully complete skills assessments before volunteering at a HHW collection event.

■ Refresher Training

- All active volunteers are required to complete an annual refresher training.
- Inactive volunteers for more than two years are required to retake the initial training before volunteering at a HHW collection event.
- Volunteers who have not attended a HHW collection event for more than three years will be required to retake initial training.

VOLUNTEER EVALUATION

- The HHW Program does not have a formal volunteer evaluation program.
- In the event that a volunteer is not working in a manner consistent with the Program's guidelines and policies, the volunteer will be counseled.
- If unacceptable behavior continues, the volunteer may be asked to leave.



VOLUNTEER SAFETY



- Volunteer safety is the HHW Program's number one concern as volunteers at collection events are at the highest risk of encountering hazards.
- The primary hazards associated with HHW collection events are:
 - Chemical exposure hazards, including fire and explosion hazards,
 - Physical hazards such as: slipping or tripping, being struck by motor vehicles, being cut by sharp surfaces, use of damaged tools or machinery, incorrect and over-lifting.
 - Biological hazards such as venomous insects, snakes or other animals,
 - Thermal hazards such as heat stress, sunburn, and fatigue.
- This risk can be greatly minimized by being aware of the potential hazards, learning how to reduce the risk of exposure or injury, following safety guidelines, and when in doubt ask questions.



COURSE LEARNING OBJECTIVES

- By the end of class each volunteer will be expected to:
 - Identify which materials, chemicals and substances are hazardous
 - Utilize product labels and warnings, waste container labels, and Material Safety Data Sheets (MSDS)
 - Follow all safe work practices at each Household Hazardous Wastes (HHW) collection site
 - Wear personal protective equipment (PPE) when handling HHW
 - Determine which materials brought to collection sites are HHW
 - Safely handle, sort, and place HHW into appropriate containers
 - Begin supervised on-the-job training at HHW collection sites

INTRO TO HAZARDOUS MATERIALS



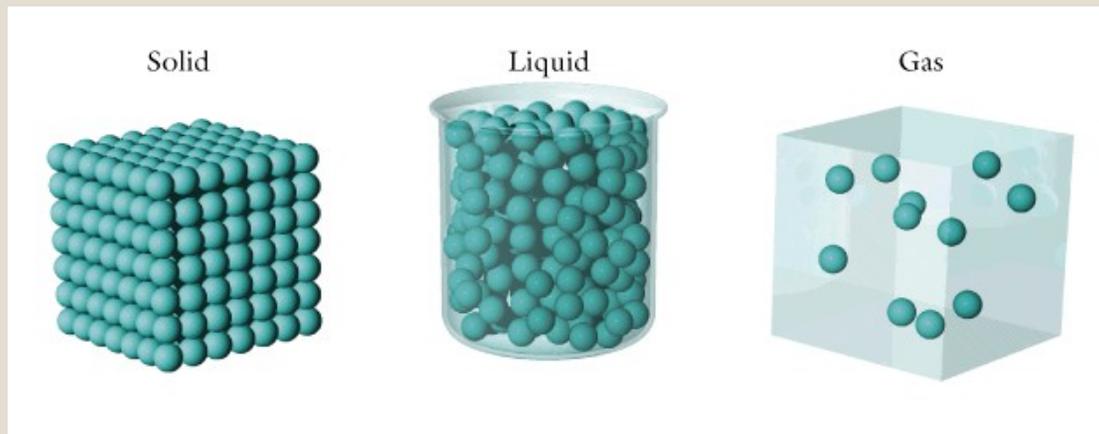
HAZARDOUS MATERIALS

- **Hazardous Materials** (also known as hazardous chemicals, substances, and wastes) can be found in almost any home or work environment.
- **Hazardous Materials** are defined by various regulatory agencies:
 - U.S. Department of Transportation (DOT)
 - U.S. Environmental Protection Agency (EPA)
 - U.S. Occupational Safety and Health Administration (OSHA)



HAZARDOUS MATERIALS DEFINED

- Simple definition of **hazardous material** is:
 - Any substance, material, chemical, compound, or waste (whether solid, liquid or gas) that when released to the environment is capable of causing damage, injury, illness or death.



RECOGNIZING HAZARDOUS MATERIALS

- Hazardous materials are often described as being **physical** and/or **health** hazards.
 - Physical hazards deal with a substance's physical properties.
 - Health hazards produce adverse reactions to the body.



PHYSICAL HAZARDS

- Common examples of physical hazards include:
 - Flammable and Combustible
 - Reactive
 - Explosive
 - Pyrophoric (spontaneously ignite)
 - Water Reactive
 - Oxidizer (releases oxygen)
 - Corrosive
 - Asphyxiant (oxygen deficient)



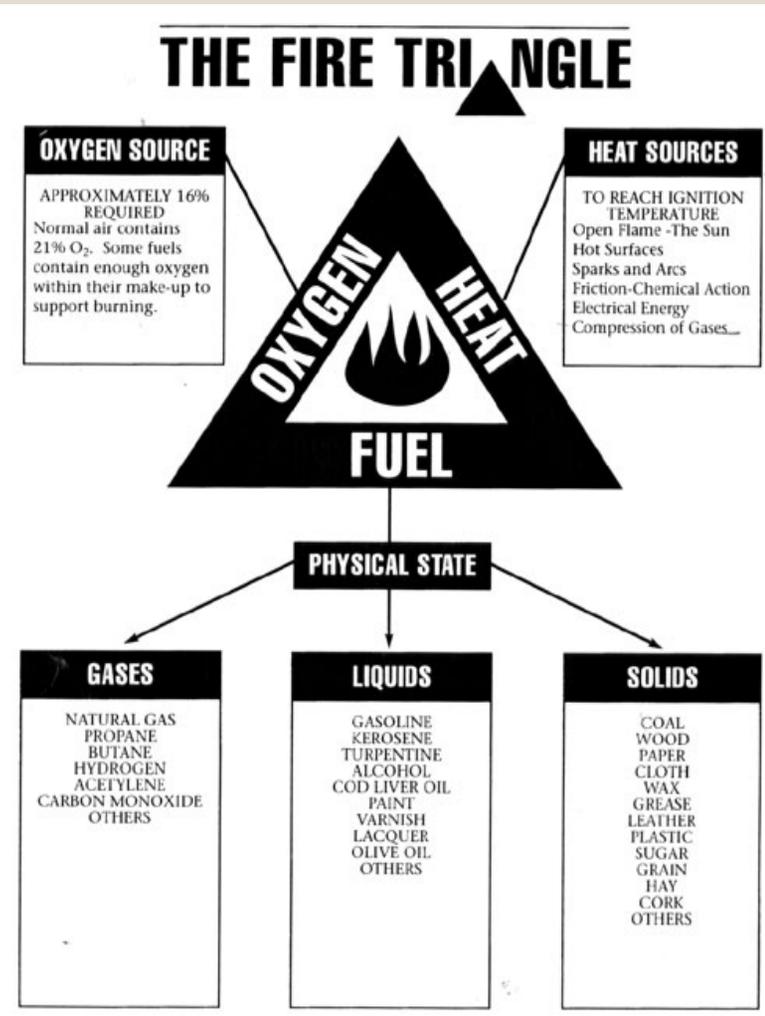
FLAMMABLES & COMBUSTIBLES

- **Flammables** are substances that are easily ignited and capable of burning rapidly.
 - Can be solid, liquid or gas
 - Degree of flammability is how easily something will ignite and burn.
 - The lower the boiling point and flash point, the more flammable the substance.
- **Combustibles** are any substance that can burn.



FLAMMABLE ATMOSPHERES

- Critical Factors necessary for flammability:
 - Enough % oxygen in the air.
 - Right amount of flammable gas or vapor, or combustible dust.
 - Vapor concentration within the flammable range.
 - Enough dust in the air creating visibility of 5 feet or less.
 - Ignition sources (e.g. sparks, smoking, combustion, heat).

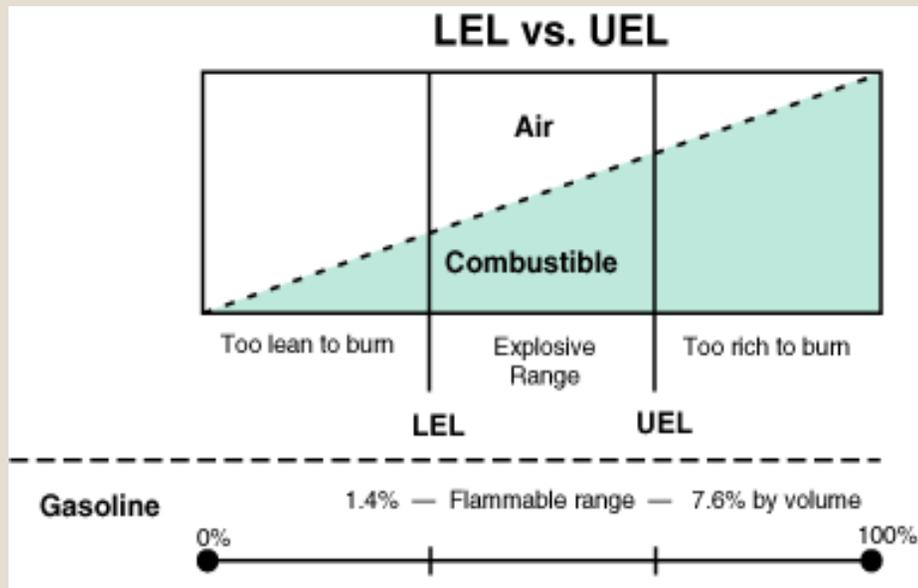


GASOLINE VAPOR VIDEOS



FLAMMABLE RANGE

- The **Flammable Range** is the vapor concentration (proper proportion) of flammable vapors mixed with air that will burn or explode if an ignition source is introduced.
 - Flammable range exists between the Lower Flammable/Explosive Limits (LFL or LEL) and Upper Flammable/Explosive Limits (UFL or UEL).



LIVE-FIRE EXPLOSION VIDEO



REACTIVES



- **Reactives** are substances that react vigorously, sometimes spontaneously, when exposed to:
 - Incompatible substances: air, moisture, other chemicals
 - Physical conditions, such as: heat, shock or pressure
- Common example:
 - Brake fluid and pool shock granules release toxic chlorine gas
- Highly reactive substances include explosives, pyrophorics, water-reactives, and peroxides.

EXPLOSIVES



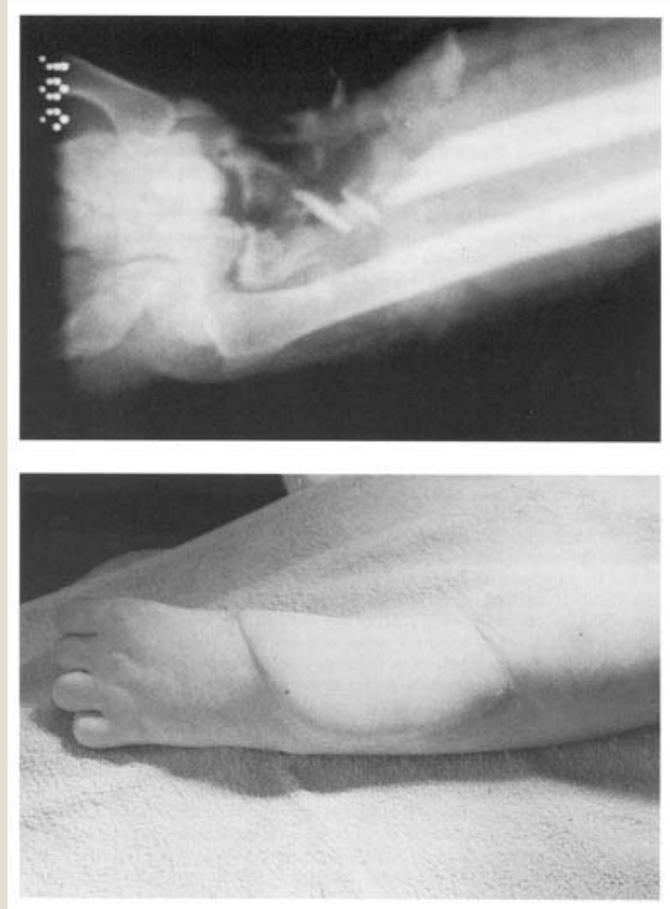
- **Explosives** initiate a sudden chemical reaction that:
 - releases gases that rapidly expand and give off energy as they become hot,
 - resulting in a flash, a pressure shockwave and loud noise.
- There are 2 classes:
 - Low explosives and
 - High explosives



LOW EXPLOSIVES



- **Low explosives** tend to deflagrate (burn) at a slower rate and create less pressure than high explosives.
 - Example: black powder used for fireworks
- Such explosive are dangerous and can cause serious bodily damage.



HIGH EXPLOSIVES



- **High explosives** create more pressure and burn very quickly, detonating (sudden expansion of materials) almost instantaneously.
 - Example: dynamite used for blasting.
- Such explosives are highly dangerous and therefore also highly regulated by many government agencies.



USING EXPLOSIVES – WHAT'S THE HAZARD?

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PYROPHORICS

- **Pyrophoric** substances ignite spontaneously in air since their auto-ignition temperatures are relatively low, often at or below room temperature.
 - Auto-ignition temperature is the lowest temperature a substance will spontaneously ignite in a normal atmosphere without an external source of ignition.
 - Example: white phosphorus auto-ignition temperature is 93°F
- Once pyrophorics ignite, the flames often extremely hot and bright, invisible.



PYROPHORIC – WHAT'S THE HAZARD?



WATER REACTIVES

- Pyrophoric substances are often water reactive, igniting when they contact water or humid air.
 - Example: alkali metals



ALKALI METALS IN WATER – WHAT'S THE HAZARD?



OXIDIZERS

- An **oxidizer** is a substance that readily transfers or yields oxygen during a chemical reaction.
 - Oxygen is a non-flammable/non-combustible gas
 - Causes flammable and combustible materials, including hair and clothing, to burn violently when ignited
 - Oxygen is a common oxidizer, forming 21% of the air we breathe
 - Common oxidizing reactions include:
 - Rust results from the oxidation of iron
 - Sliced fruit, such as apples, turn brown



PURE OXYGEN – WHAT'S THE HAZARD?

Rag without oxygen
saturation.

ORGANIC PEROXIDES



- **Organic peroxides** are unstable oxidizing compounds that:
 - can form spontaneously in some material resulting in heat and the accumulation of explosive, corrosive and/or toxic compounds
 - are sensitive to shocks and ignition sources, burning very rapidly and intensely releasing toxic smoke.
 - tend to react with metals.
 - are sensitive to light and have to be stored in darkness.
 - may decompose at room temperature and have to be refrigerated.
 - Example: benzoyl peroxide, an ingredient used for treating acne

ORGANIC PEROXIDE + FIRE – WHAT'S THE HAZARD?



CORROSIVES

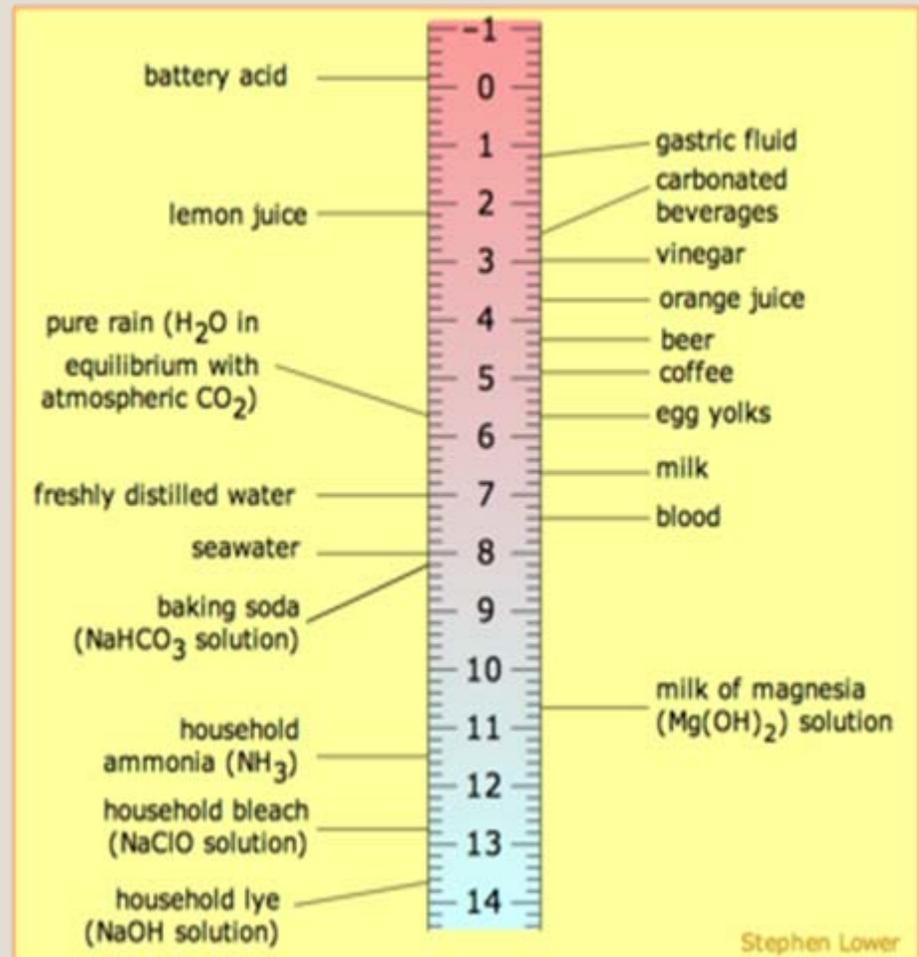


- A **corrosive** is a reactive substance that destroys or irreversibly damages another substance with which it comes in contact.
 - Common corrosives are acids, bases and oxidizers.
 - The stronger the acid or base, the more corrosive it is.



CORROSIVES

- **pH** is a measure of acidity or basicity.
 - Pure water is considered neutral with a **pH of 7.0**.
 - Acids have low pH: **0 < 7.0**
 - Bases (called caustics or alkalis) have high pH: **+7.0 < 14**
- Combining acids with bases creates water, salt, and usually heat.



CORROSIVE SPILL – WHAT'S THE HAZARD?



ASPHYXIANTS

- Asphyxia is a condition of oxygen deficiency in the body due to being unable to breathe normally.
- **Asphyxiant** atmospheres can be the result of:
 - Inert (non-reactive) gases that dilute or displace oxygen
 - Non-toxic, invisible and usually have no odor
 - Examples: helium, nitrogen, LP Gas, argon, liquid nitrogen
 - Low or no oxygen
 - Oxygen is consumed (by combustion or chemical reaction) or displaced by inert gas
 - Toxic gases, fumes or vapors
 - Cause asphyxia from interaction with or damage to respiratory system
 - Example: carbon monoxide bonds to blood preventing the oxygen from being absorbed by cells

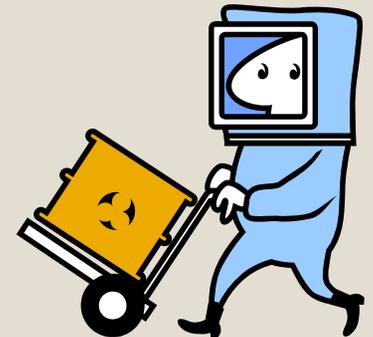


CARBON MONOXIDE ACCIDENT VIDEO



HEALTH HAZARDS

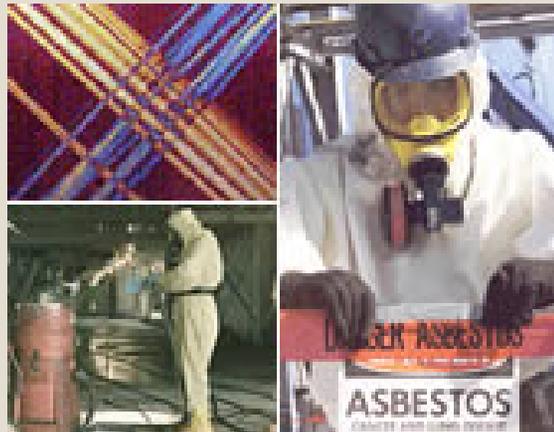
- **Health hazards** are substances for which there is significant evidence that acute or chronic health effects may occur in exposed volunteers, including:
 - Toxic Substances
 - Irritants and Sensitizers
 - Carcinogens
 - Mutagenic and Teratogenic (reproductive hazards)
 - Biologicals
 - Radioactive Substances



TOXIC SUBSTANCES



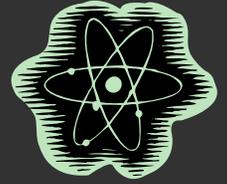
- **Toxic substances** (sometimes called poisonous or poisons) are directly harmful to living organisms.
 - Can affect the entire organism or a substructure of the organism (e.g. body organ, tissues or cells) .
 - Practically every substance is toxic, the only difference is in the quantity (or dose) that produces a toxic effect.



TOXIC SMOKE EXPOSURE VIDEO



TOXIC SUBSTANCES



- There are generally three categories of toxic substances:
 - Chemical
 - Examples: asbestos, lead, mercury, methyl alcohol (in antifreeze), chlorine gas, poisons (e.g. rodenticide) and many medicines.
 - Biological
 - Examples: bacteria (e.g. Anthrax) and viruses (e.g. Hepatitis).
 - Physical
 - Example: uranium, radon and other radioactive materials (i.e. substances emitting ionizing radiation).

TOXICITY

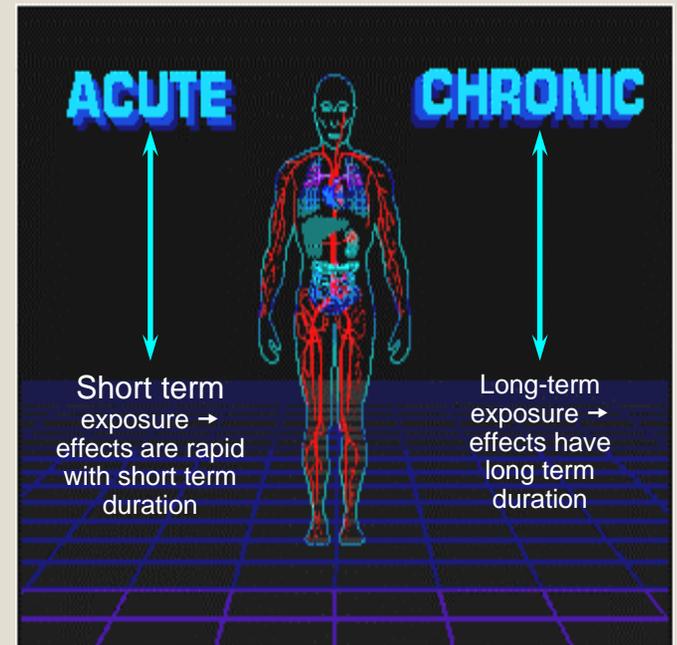
- **Toxicity** is the degree to which a substance is able to damage an exposed organism.
- Types of toxicity include:
 - Major/minor damage
 - Lethality to specific organs
 - Lethality to the entire body
 - Cancer causing/contributing
 - Genetic/reproductive damage
- Exposure to highly toxic chemicals, OSHA's highest toxic rating, results in serious injury or death.



TOXICITY



- Acute exposure is a single exposure (often high dose) which may result in severe harm or death, usually lasting no longer than a few days.
 - Examples: irritation, lethal dose
- Chronic exposure is continuous (often low dose) over an extended period of time, usually months or years, which can cause long term irreversible effects.
 - Examples: sensitization, carcinogens, mutagens, teratogens



IRRITANTS

- **Irritant substances** are chemicals which cause a reversible inflammatory effect on tissues at the site of contact.
 - The majority of occupational skin disease is irritant contact dermatitis (localized skin rash or irritation).
 - Respiratory irritants can cause nose, throat and lung irritation, such as bronchitis if inhaled.



SENSITIZERS

- **Sensitizers** are substances that cause an allergic reaction in tissues after repeated exposure.
 - Sensitization is an immune response - some people may be easily sensitized while others may never be affected
 - Reactions to a sensitizer, or other similar chemicals, can appear suddenly and may be fatal in rare circumstances
 - This allergic reaction is called chemical hypersensitivity.

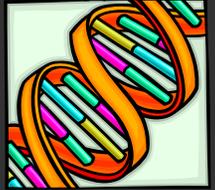


CARCINOGENS



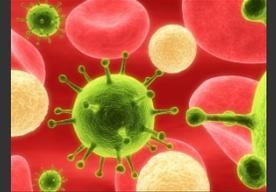
- A **carcinogen** is any substance or other agent (such as radiation) directly involved in causing cancer.
 - Cancer is a large class of diseases in which a group of cells grow uncontrollably, invade upon and destroy adjacent tissues, and often spread to other locations in the body.
- Only a relatively small number (about 55) of the many thousands of chemicals in use today do cause cancer.
 - Approximately 250 other chemicals are believed to be carcinogenic from animal testing.

MUTAGENS & TERATOGENS



- Mutagens are any substance that can cause a mutation (change in the sequence or structure of DNA) in genes and chromosomes.
 - Mutagens may cause changes in human sperm or egg cells that may be passed on to successive generations
- Teratogens are substances that cause birth defects in developing fetus.
 - Effects the fetus only and are not hereditary
- *Many carcinogens are also mutagens/teratogens.*

BIOLOGICAL AGENTS

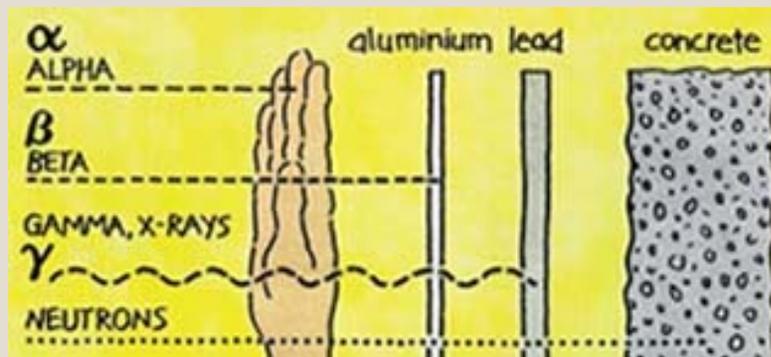


- **Biological agents** are organisms, bacteria, viruses, or toxins that have illness-producing effects on people, livestock, and crops.
 - Examples include anthrax, e-coli and salmonella, and bloodborne pathogens (e.g. HIV and hepatitis).



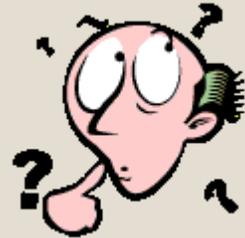
RADIOACTIVE SUBSTANCES

- **Radioactive substances** emit ionizing radiation (IR).
 - Major types are alpha, beta, gamma and x-rays
 - IR is invisible and undetectable by the human senses, so instruments such as geiger counters are required to detect its presence.
- Exposure to radiation causes microscopic damage to living tissue, resulting in:
 - skin burns, radiation sickness and death at high doses, and can result in cancer, tumors and genetic damage at low doses.



KNOWLEDGE REVIEW

- What is the definition of a Hazardous Material?
- Name 3 types of physical hazards?
- Name 3 types of health hazards?
- What hazard does a flammable pose?
- Name 2 types of reactive materials?
- What hazard does a corrosive pose?
- What is the difference between an irritant and a sensitizer?
- What hazard does a carcinogen pose?
- What hazard does a radioactive material pose?



ANY QUESTIONS?



HAZARDOUS MATERIALS SAFETY



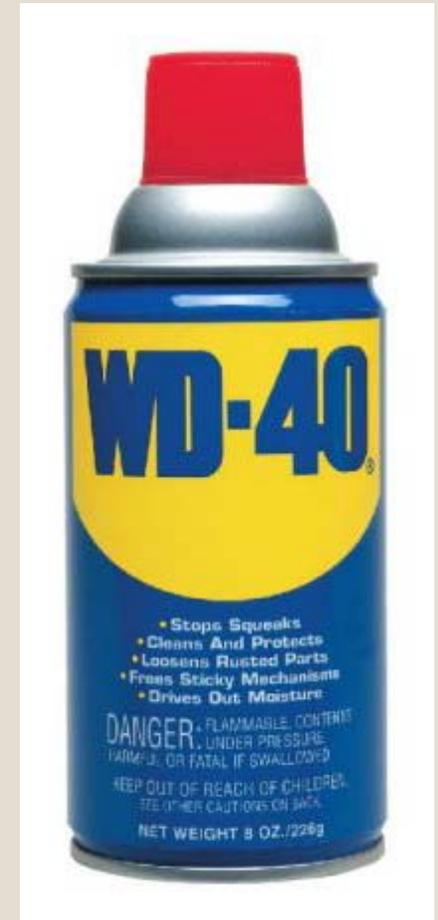
MANAGING HAZARDOUS MATERIALS SAFETY



- Several steps can be taken to protect volunteers from hazardous materials:
 - Gain knowledge about the hazardous materials in use and those they may come into contact with while working
 - Become familiar with OSHA, DOT, EPA, and any other industry standards related to hazardous materials and toxic substances
 - Develop and implement hazard prevention strategies and procedures in the workplace
 - Train volunteers in the correct use, handling and protections necessary to prevent exposure to hazardous materials

IDENTIFYING HAZARDOUS MATERIALS

- References available to determine if materials are hazardous, safe use and handling, physical and health hazards, and other information and instructions include:
 - Product labeling and warnings
 - Warning signs, symbols and pictograms
 - DOT HAZMAT markings, labels and placards
 - Material Safety Data Sheets
 - Manufacturer and distributor websites



CONSUMER PRODUCT LABELING

- Product Labeling is required to include the following information on consumer chemical products:
 - Common or chemical name(s)
 - Description of hazards involved in using the product
 - Signal Words must be included:
 - "DANGER" on substances which are extremely highly toxic.
 - "POISON" additionally for substances which are highly toxic.
 - "WARNING" or "CAUTION" on all other hazardous substances.
 - Precautions statement of what to do to avoid the hazard
 - Instructions for Safe Handling and Storage
 - First Aid Instructions, when necessary or appropriate
 - Name and Address of Manufacturer, Distributor, Packer or Seller



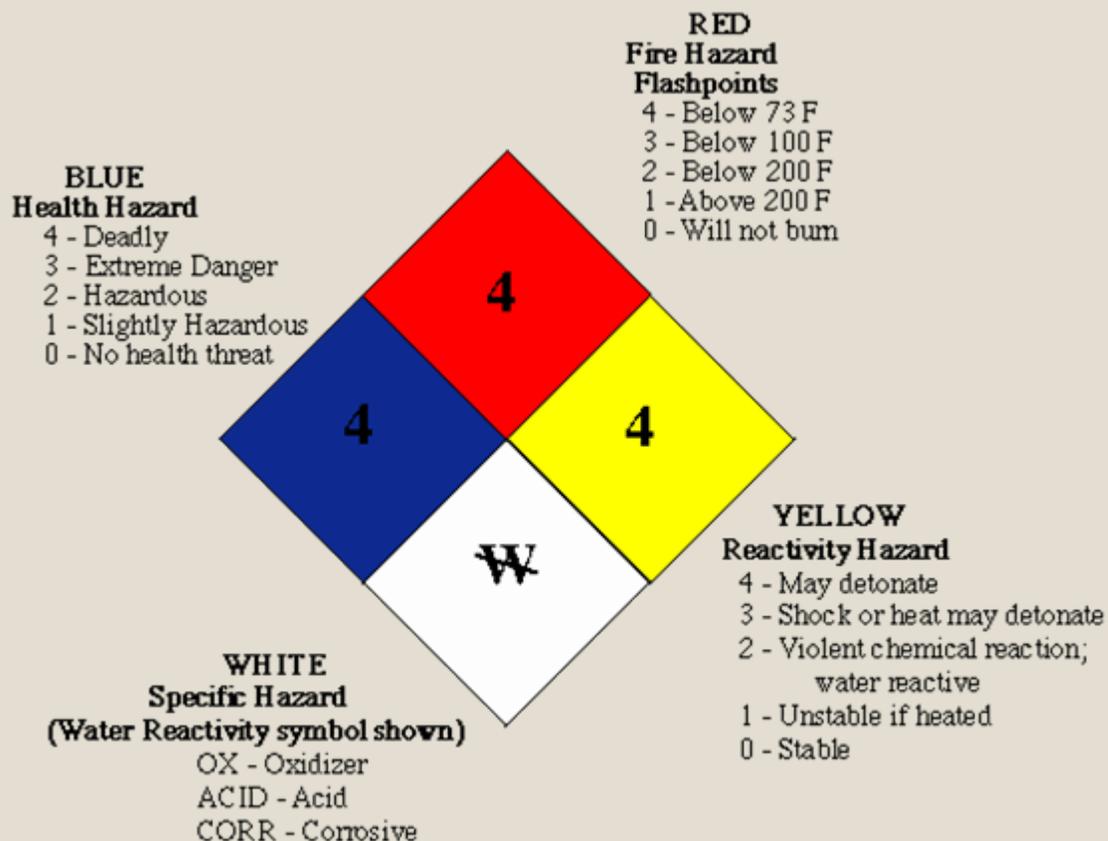
EPA LABELS

- The EPA requires a number of labels, including, but not limited to, pesticide and hazardous waste labels.
- Every pesticide product must bear a label containing:
 - Name, brand, or trademark under which the product is sold,
 - EPA registration number,
 - Warning or precautionary statements, and
 - Other helpful information.



NFPA 704 STANDARD HAZARD WARNING SYSTEM

- The National Fire Protection Association (NFPA) has developed a rating system for indicating the health, flammability, and reactivity hazards of chemicals.
- Based on a hazard rating scale of 0 to 4.
- Special precaution symbols may also be used where necessary.



HMIS HAZARD WARNING SYSTEM

- Hazardous Materials Identification System, (HMIS) system utilizes, numbers, colored bars and symbols to convey the chemical hazards and required protective equipment.

Chemical Name	
HEALTH	0
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	0

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM				
HAZARD INDEX			PERSONAL PROTECTION INDEX	
4 = SEVERE HAZARD	An asterisk(*) or other designation corresponds to additional information on a data sheet or separate chronic effects notification		A	
3 = SERIOUS HAZARD			B	
2 = MODERATE HAZARD			C	
1 = SLIGHT HAZARD			D	
0 = MINIMAL HAZARD	Additional Information		E	
PERSONAL PROTECTION EQUIPMENT				
A	n	o	p	
 Safety Glasses	 Splash Goggles	 Face Shield & Eye Protection	 Gloves	
q	r	s	t	
 Boots	 Synthetic Apron	 Full Suit	 Heat Respirator	
u	w	y	z	
 Vapor Respirator	 Cloud & Vapor Respirator	 Full Face Respirator	 Airline Hood or Mask	
X	Consult your supervisor or S.O.P. for "SPECIAL" handling directions			

GLOBALLY HARMONIZED SYSTEM HAZARD PICTOGRAMS

GHS Pictograms

Carcinogen
Respiratory
Sensitizer
Reproductive
Toxicity
Target Organ
Toxicity
Mutagenicity
Aspiration Hazard



Acute
Toxicity
(severe)



Flammables
Self-Reactive
Pyrophorics
Self-Heating
Emits
Flammable
Gas



Environmental
Toxicity



Irritant
Derma/Skin
Sensitizers
Acute Toxicity
(Harmful)
Transient
Target Organ
Effects (narcotic
or respiratory)



Oxidizers
Organic
Peroxides



Corrosives



Gases
under
Pressure

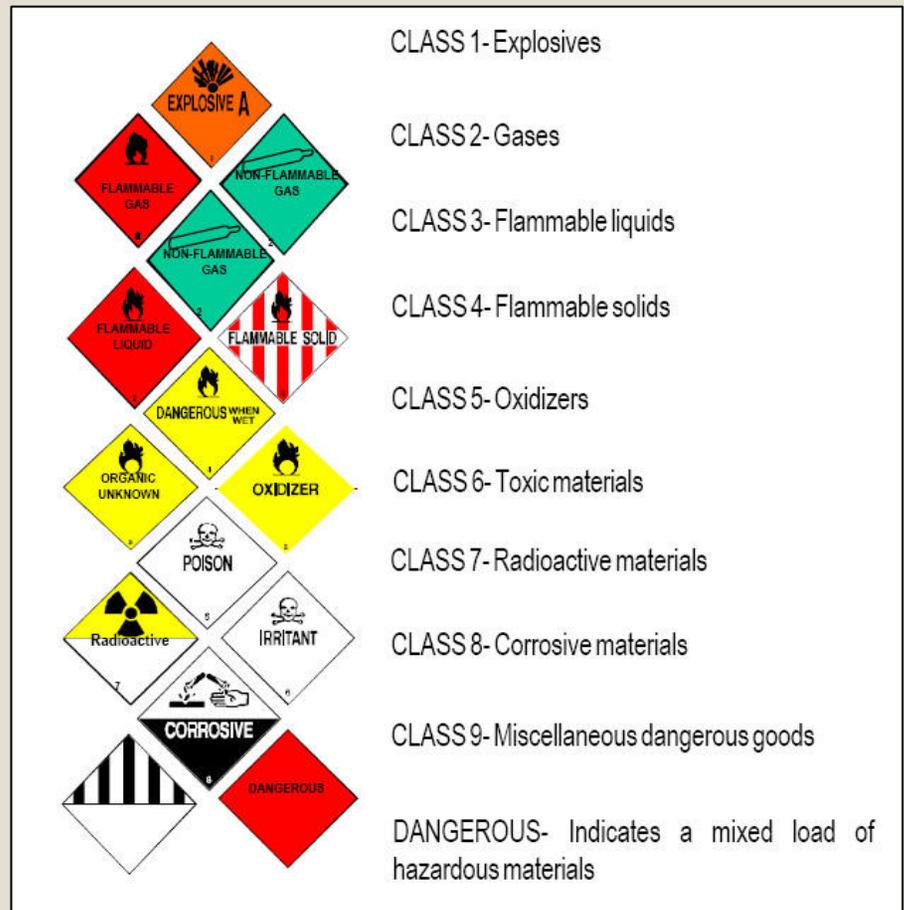


Explosive
Self-Reactive
Organic
Peroxides



TRANSPORTATION DANGEROUS GOODS & HAZARDOUS MATERIALS “HAZMAT”

- U.S. Dept. of Transportation (DOT) requires the use of standardized hazardous materials transport markings, labels, and placards in accordance with 49 CFR 172.
- DOT divides regulated hazardous materials into nine classes.



HAZARDOUS MATERIAL MARKINGS

- Examples include:

HAZARDOUS MATERIALS MARKINGS

Package Orientation
(Red or Black)



§172.312(a)

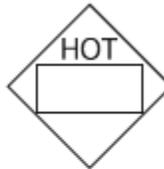
Keep Away from Heat



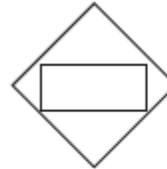
§172.317



§173.25(a)(4)



§172.325



§172.332(a)

Fumigant Marking
(Red or Black)



§172.302(g) and §173.9

Biological Substances,
Category B



§173.199 (a)(5)



§172.313(a)



§172.316(a)

Excepted Quantity



§173.4a(g)

Marking of IBCs



§178.703(a)(vii)(B)

Marine Pollutant



§172.322

HAZARDOUS MATERIAL LABELS

Hazardous Materials Warning Labels

Actual label size: at least 100 mm (3.9 inches) on all sides

CLASS 1 Explosives:
Divisions 1.1, 1.2, 1.3, 1.4, 1.5, 1.6



§172.411

* Include compatibility group letter.

** Include division number and compatibility group letter.

CLASS 2 Gases:
Divisions 2.1, 2.2, 2.3



§172.405(b), §172.415, §172.416, §172.417

CLASS 3 Flammable Liquid



§172.419

CLASS 4 Flammable Solid, Spontaneously Combustible, and Dangerous When Wet:
Divisions 4.1, 4.2, 4.3



§172.420, §172.422, §172.423

CLASS 5 Oxidizer, Organic Peroxide: Divisions 5.1 and 5.2



Organic Peroxide, Transition-2011

§172.426, §172.427

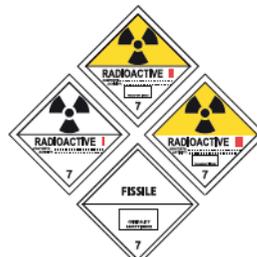
CLASS 6 Poison (Toxic), Poison Inhalation Hazard, Infectious Substance: Divisions 6.1 and 6.2



§172.323, §172.405(c), §172.429, §172.430, §172.432

For Regulated Medical Waste (RMW), an Infectious Substance label is not required on an outer packaging if the OSHA Biohazard marking is used as prescribed in 29 CFR 1910.1030(g). CDC Etiologic Agent label must be used as prescribed in 42 CFR 72.3 and 72.6. A bulk package of RMW must display a BIOHAZARD marking.

CLASS 7 Radioactive



§172.436, §172.438, §172.440, §172.441

CLASS 8 Corrosive



§172.442

CLASS 9 Miscellaneous Hazardous Material



§172.446

or



Subsidiary Risk Label



§172.411

Empty Label



§172.450

Cargo Aircraft Only



Mandatory January 1, 2013



§172.448

HAZMAT SHIPPING DOCUMENTS

- Hazardous materials are required to have shipping documents identifying the chemical name and hazard classes for the material contained in the package/container from the moment it leaves the manufacturer facility all the way until the package/container is delivered and received to the destination.

HAZARDOUS MATERIAL & DANGEROUS GOODS SHIPPING PAPER

1. (23) 456-7890	2. Joe's Place Austin, TX	3. 3-456
4. Hexamethyleneimine, 3, UN 2493, PG II, 1L		
5. IS REQUIRED: Flammable Liquid, Corrosive		6. XXXXX
8. John Doe 10/7/98	7. XXXXX	1

PLEASE REMOVE THIS COPY AT DEPARTURE

PLEASE REMOVE THIS COPY AT DESTINATION

DO NOT REMOVE THIS COPY

ups

MATERIAL SAFETY DATA SHEETS

- A Material Safety Data Sheet (MSDS) is a document that contains information on the potential hazards (e.g. physical, health and environmental) and how to work safely with the chemical product.
- MSDSs are prepared by the supplier or manufacturer of the material.

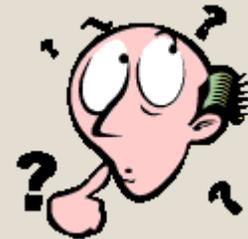
 Clorox Professional Products Company 1221 Broadway Oakland, CA 94612 Tel: (510) 271-7000		Material Safety Data Sheet									
I Product: COMMERCIAL SOLUTIONS® ULTRA CLOROX® GERMICIDAL BLEACH I											
Description: CLEAR, LIGHT YELLOW LIQUID WITH CHLORINE ODOR											
Other Designations											
EPA Reg. No. 67819-6 Sodium Hypochlorite Solution	Clorox Sales Company 1221 Broadway Oakland, CA 94612	Emergency Telephone Nos. For Medical Emergencies, call 1-800-468-1014 For Transportation Emergencies, call Chemtrec: 1-800-426-9000									
II Health Hazard Data		III Hazardous Ingredients									
INGREDIENTS: DANGER: CORROSIVE. May cause severe irritation or damage to eyes and skin. Harmful if swallowed. The following medical conditions may be aggravated by exposure to high concentrations of vapor or mist: heart conditions or chronic respiratory problems such as asthma, chronic bronchitis, or obstructive lung disease. Some clinical reports suggest a low potential for sensitization upon exaggerated exposure to sodium hypochlorite, particularly on damaged or irritated skin. Routine clinical tests conducted on intact skin with Clorox Liquid Bleach found no sensitization in the test subjects. Under normal consumer use conditions the likelihood of any adverse health effects are low.		<table border="1"> <thead> <tr> <th>Ingredient</th> <th>Concentration</th> <th>Worker Exposure Limit</th> </tr> </thead> <tbody> <tr> <td>Sodium hypochlorite CAS # 7681-52-9</td> <td>6.0 - 7.35%</td> <td>Not established.</td> </tr> <tr> <td>Sodium hydroxide CAS # 1310-73-2</td> <td>< 0.2%</td> <td>2 mg/m³ TLV-STEL* 2 mg/m³ PEL*</td> </tr> </tbody> </table>	Ingredient	Concentration	Worker Exposure Limit	Sodium hypochlorite CAS # 7681-52-9	6.0 - 7.35%	Not established.	Sodium hydroxide CAS # 1310-73-2	< 0.2%	2 mg/m ³ TLV-STEL* 2 mg/m ³ PEL*
Ingredient	Concentration	Worker Exposure Limit									
Sodium hypochlorite CAS # 7681-52-9	6.0 - 7.35%	Not established.									
Sodium hydroxide CAS # 1310-73-2	< 0.2%	2 mg/m ³ TLV-STEL* 2 mg/m ³ PEL*									
FIRST AID: EYE CONTACT: Rinse with plenty of water for at least 15 minutes. Get prompt medical attention. SKIN CONTACT: Wash skin thoroughly with soap and water. INGESTION: Drink large amounts of water. DO NOT induce vomiting. Call a physician or poison control center immediately. INHALATION: If breathing problems develop, remove to fresh air.		*TLV-STEL = ACGIH Threshold Limit Value - Short Term Exposure Limit *PEL = OSHA Permissible Exposure Limit - Time Weighted Average None of the ingredients in this product are on the IARC, NTP or OSHA carcinogen list.									
IV Special Protection and Precautions		V Transportation and Regulatory Data									
Hygiene Precautions: Wear safety glasses. With repeated or prolonged use, wear nitrile, neoprene, or butyl rubber gloves. Wash after contact with product. Avoid breathing vapors. Engineering Controls: Use general ventilation to minimize exposure to vapor or mist. Work Precautions: Avoid eye and skin contact and inhalation of vapor or mist. KEEP OUT OF THE REACH OF CHILDREN.		DOT: Not restricted per 49CFR172.101(c)(12)(iv). MDG: Not restricted per IMDG Code Page 0021 Paragraph 5.3.5. ATA: Not restricted per IATA D.G.R. Special provision A3. TSCA (MSHA/TSCA Inventory): This product is regulated under Sections 311012. This product contains no chemicals regulated under Section 313 and contains sodium hypochlorite and sodium hydroxide which are regulated under Section 304CERCLA. TSCA Status: All components of this product are on the TSCA Inventory.									
VI Spill Procedures/Waste Disposal		VII Reactivity Data									
Spill Procedures: Absorb and containize. Wash residual down to sanitary sewer. Contact the sanitary treatment facility in advance to assure ability to process washed-down material. For spills of multiple products, responders should evaluate the MSDS's of the products for incompatibility with sodium hypochlorite. Breathing protection should be worn in enclosed, and/or poorly ventilated areas until hazard assessment is complete. Waste Disposal: Dispose of in accordance with all applicable federal, state, and local regulations.		Stable under normal use and storage conditions. Strong oxidizing agent. Reacts with other household chemicals such as toilet bowl cleaners, rust removal, vinegar, acids or ammonia containing products to produce hazardous gases, such as chlorine and other chlorinated species. Prolonged contact with metal may cause pitting or discoloration.									
VIII Fire and Explosion Data		IX Physical Data									
Not flammable or explosive. In a fire, cool containers to prevent rupture and release of sodium chlorate.		Boiling point.....212°F/100°C (at atmospheric pressure) Specific gravity (H ₂ O=1, 21°C).....~1.10 Solubility in water.....Complete pH.....~11.4									
<small>©1991, 1994 THE CLOROX COMPANY DATA SUPPLIED IS FOR USE ONLY IN CONNECTION WITH OCCUPATIONAL SAFETY AND HEALTH DATA PREPARED 4/92</small>											

RESOURCES ON THE INTERNET

- Hazardous material manufacturer and often distributor websites provide ready access to product technical specification sheets, MSDS, and other valuable information.
- Various regulatory and government websites:
 - www.osha.gov
 - www.cdc.gov/niosh
 - www.dot.gov
 - <http://phmsa.dot.gov/hazmat/library/erg>
 - www.atsdr.cdc.gov
 - <http://hazard.com/msds/index.php>
 - <http://www.ilpi.com/msds/>

KNOWLEDGE REVIEW

- Name 3 places to find information about hazardous materials?
- What basic information is on a product label?
- What are hazard pictograms?
- Describe a the NFPA diamond label numbering system?
- What do DOT markings and labels describe?



ANY QUESTIONS?



HAZARDOUS MATERIAL EXPOSURE & INJURY PREVENTION

- Upon identifying that hazardous materials will be handled, exposure and injury prevention methods can be determined and implemented.
 - Methods of protection may include:
 - Implementation of mandatory OSHA programs:
 - *Hazard Communication Program*
 - *HAZWOPER Incident Response Program*
 - Work-practice controls to reduce hazard exposure
 - Training volunteers, safe handling practices, housekeeping, proper storage
 - Personal protective equipment (PPE)
 - Required to be used to prevent exposure as a last resort.



WHAT IS HAZARD COMMUNICATION?

- OSHA's Hazard Communication Standard, 29 CFR 1910.1200, is based on the concept that workers:
 - have both a need and a “**right to know**” the identities and hazards of the chemicals they are exposed to when working, and
 - need to know what protective measures are available to prevent adverse effects from occurring.



HAZARD COMMUNICATION PROGRAM VIDEO



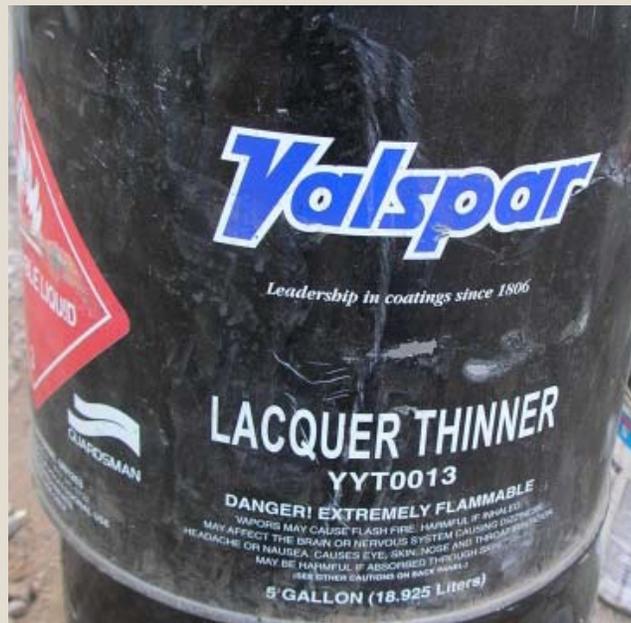
EMPLOYER HAZARD COMMUNICATION PROGRAM

- To comply with the Hazard Communication Standard, employers must:
 - Identify and list all hazardous chemicals in the workplace.
 - Obtain MSDS and labels for each hazardous chemical (if not provided by the manufacturer, importer or distributor).
 - Develop a written Hazard Communication Program (HCP).
 - Communicate hazard information to workers through labels, MSDS and formal HCP training.



CHEMICAL LABELS

- Chemical manufacturers, importers, distributors and employers must all comply with Hazard Communication Standard labeling requirements.
 - Employers purchasing chemicals can rely on the labels provided by their suppliers.



EMPLOYER LABELING REQUIREMENTS

- Employers must ensure that each container of hazardous chemicals in the workplace is be labeled, tagged or marked with the following information:
 - identity of the hazardous chemical(s) in each container, and
 - hazard warnings, words, pictures, symbols, or a combination, which provides at least general information regarding the physical and health hazards of the hazardous chemical.



EMPLOYER LABELING REQUIREMENTS

- Ensure labels are not removed or defaced.
- Replace missing or unreadable labels.
- Instruct workers to read the labels.
 - If the labels do not provide enough information, volunteers should refer to the chemical MSDS.



LABELING PROBLEMS...

- What's in the containers?



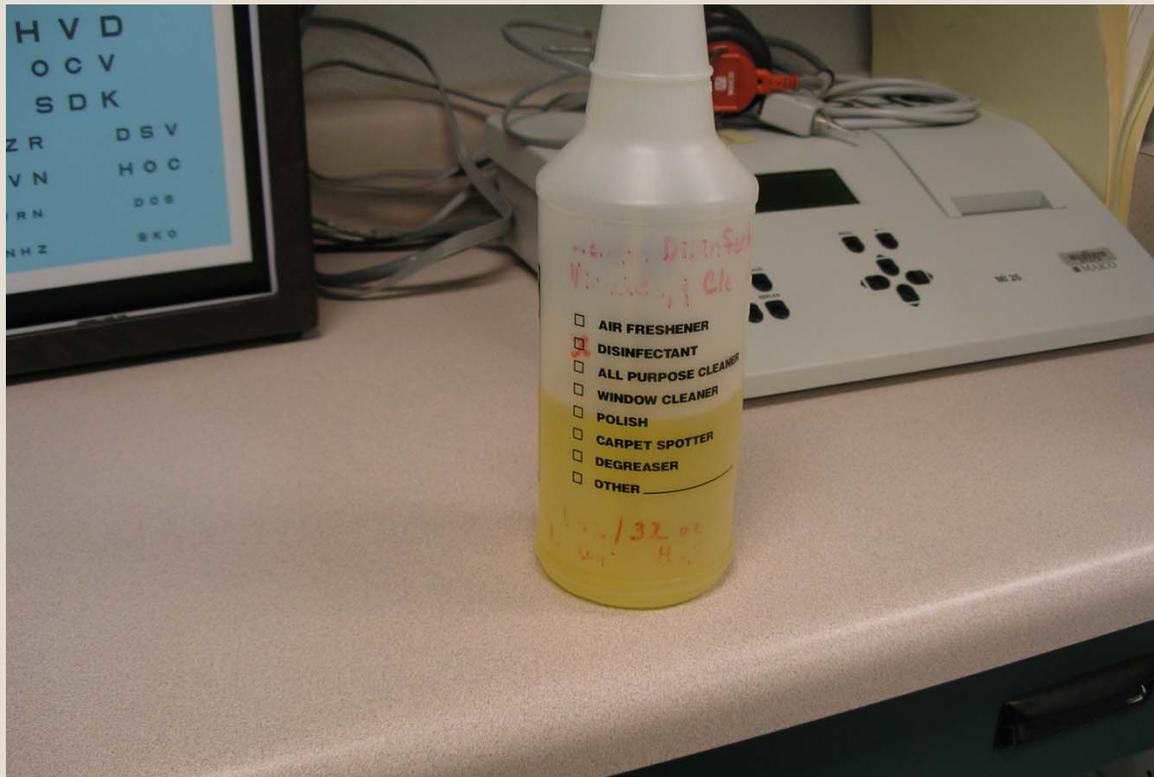
LABELING PROBLEMS...

- What's usually in this type of bottle?



LABELING PROBLEMS...

- What's wrong with this labeling?



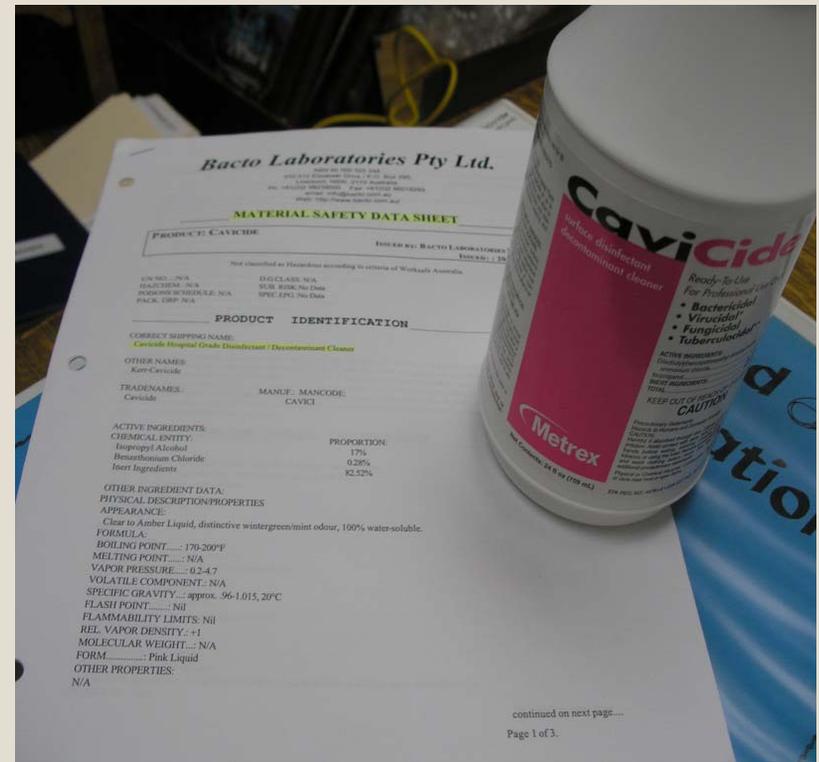
LABELING PROBLEMS...

- What's good and bad here?



MATERIAL SAFETY DATA SHEETS

- The Hazard Communication Standard requires chemical manufacturers and importers evaluate their chemicals and prepare Material Safety Data Sheets (MSDS) for distributors, suppliers and end users.
 - Employers can rely on the information provided in the MSDS and do not have to do independent chemical analysis.



MATERIAL SAFETY DATA SHEETS (MSDS)

■ MSDS have 16 Sections containing the following information:

- ✓ chemical identification
- ✓ hazard identification
- ✓ composition/ingredients
- ✓ first-aid measures
- ✓ fire-fighting measures
- ✓ accidental release measures
- ✓ proper handling & storage
- ✓ exposure controls & PPE
- ✓ physical & chemical properties
- ✓ stability & reactivity
- ✓ toxicology information
- ✓ ecological information
- ✓ disposal information
- ✓ transport information
- ✓ regulatory information
- ✓ other info & preparation date

MSDS CONTENTS

SECTION 1: Chemical Identification



Material Safety Data Sheet

1 - Chemical Product and Company Identification

Manufacturer: WD-40 Company

Address: 1061 Cudahy Place (92110)
P.O. Box 80607
San Diego, California, USA
92138 -0607

Telephone:

Emergency only: 1-888-324-7596 (PROSAR)

Information: 1-888-324-7596

Chemical Spills: 1-800-424-9300 (Chemtrec)
1-703-527-3887 (International Calls)

Chemical Name: Organic Mixture

Trade Name: WD-40 Aerosol

Product Use: Lubricant, Penetrant, Drives Out
Moisture, Removes and Protects Surfaces
From Corrosion

MSDS Date Of Preparation: 3/11/10

MSDS CONTENTS



■ SECTION 2: Hazard(s) Identification

2 – Hazards Identification

Emergency Overview:

DANGER! Flammable aerosol. Contents under pressure. Harmful or fatal if swallowed. If swallowed, may be aspirated and cause lung damage. May cause eye irritation. Avoid eye contact. Use with adequate ventilation. Keep away from heat, sparks and all other sources of ignition.

Symptoms of Overexposure:

Inhalation: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. Intentional abuse may be harmful or fatal.

Skin Contact: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.

Eye Contact: Contact may be irritating to eyes. May cause redness and tearing.

Ingestion: This product has low oral toxicity. Swallowing may cause gastrointestinal irritation, nausea, vomiting and diarrhea. This product is an aspiration hazard. If swallowed, can enter the lungs and may cause chemical pneumonitis, severe lung damage and death.

Chronic Effects: None expected.

Medical Conditions Aggravated by Exposure: Preexisting eye, skin and respiratory conditions may be aggravated by exposure.

Suspected Cancer Agent:

Yes No X

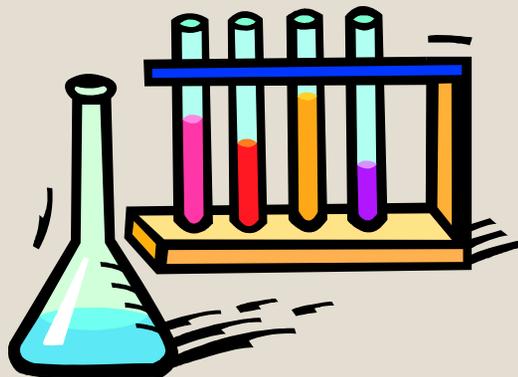
MSDS CONTENTS



SECTION 3: Composition/Information on Ingredients

3 - Composition/Information on Ingredients

Ingredient	CAS #	Weight Percent
Aliphatic Hydrocarbon	64742-47-8	45-50
Petroleum Base Oil	64742-58-1 64742-53-6 64742-56-9 64742-65-0	<25
LVP Aliphatic Hydrocarbon	64742-47-8	12-18
Carbon Dioxide	124-38-9	2-3
Surfactant	Proprietary	<2
Non-Hazardous Ingredients	Mixture	<10



MSDS CONTENTS



■ SECTION 4: First-aid Measures

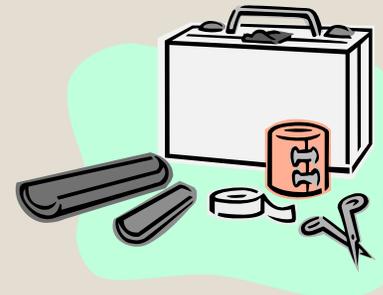
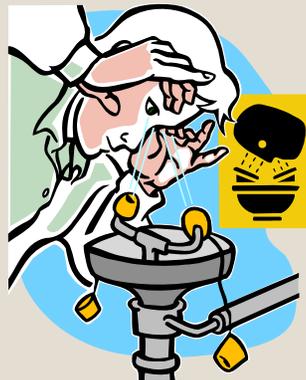
4 – First Aid Measures

Ingestion (Swallowed): Aspiration Hazard. DO NOT induce vomiting. Call physician, poison control center or the WD-40 Safety Hotline at 1-888-324-7596 immediately.

Eye Contact: Flush thoroughly with water. Remove contact lenses if present after the first 5 minutes and continue flushing for several more minutes. Get medical attention if irritation persists.

Skin Contact: Wash with soap and water. If irritation develops and persists, get medical attention.

Inhalation (Breathing): If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.



MSDS CONTENTS



■ SECTION 5: Fire-fighting Measures

5 – Fire Fighting Measures

Extinguishing Media: Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet or flooding amounts of water. Burning product will float on the surface and spread fire.

Special Fire Fighting Procedures: Firefighters should always wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water. Use shielding to protect against bursting containers.

Unusual Fire and Explosion Hazards: Contents under pressure. Keep away from ignition sources and open flames. Exposure of containers to extreme heat and flames can cause them to rupture often with violent force. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back.



MSDS CONTENTS



■ SECTION 6: Accidental Release Measures

6 – Accidental Release Measures

Wear appropriate protective clothing (see Section 8). Eliminate all sources of ignition and ventilate area. Leaking cans should be placed in a plastic bag or open pail until the pressure has dissipated. Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly. Report spills to authorities as required.



MSDS CONTENTS

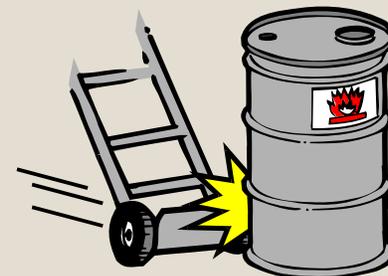
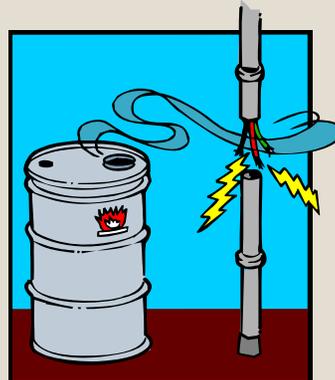


SECTION 7: Handling and Storage

7 – Handling and Storage

Handling: Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Use only with adequate ventilation. Keep away from heat, sparks, pilot lights, hot surfaces and open flames. Unplug electrical tools, motors and appliances before spraying or bringing the can near any source of electricity. Electricity can burn a hole in the can and cause contents to burst into flames. To avoid serious burn injury, do not let the can touch battery terminals, electrical connections on motors or appliances or any other source of electricity. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep out of the reach of children. Do not puncture, crush or incinerate containers, even when empty.

Storage: Store in a cool, well-ventilated area, away from incompatible materials Do not store above 120°F or in direct sunlight. U.F.C (NFPA 30B) Level 3 Aerosol.



MSDS CONTENTS



SECTION 8: Exposure Controls and Personal Protection (PPE)

8 – Exposure Controls/Personal Protection

Chemical	Occupational Exposure Limits
Aliphatic Hydrocarbon	1200 mg/m ³ TWA (manufacturer recommended)
Petroleum Base Oil	5 mg/m ³ TWA, 10 mg/m ³ STEL ACGIH TLV 5 mg/m ³ TWA OSHA PEL
LVP Aliphatic Hydrocarbon	1200 mg/m ³ TWA (manufacturer recommended)
Carbon Dioxide	5000 ppm TWA (OSHA/ACGIH), 30,000 ppm STEL (ACGIH)
Surfactant	None Established
Non-Hazardous Ingredients	None Established



MSDS CONTENTS



■ SECTION 8: Exposure Controls and Personal Protection (PPE)

The Following Controls are Recommended for Normal Consumer Use of this Product

Engineering Controls: Use in a well-ventilated area.

Personal Protection:

Eye Protection: Avoid eye contact. Always spray away from your face.

Skin Protection: Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.

Respiratory Protection: None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Controls are Recommended

Engineering Controls: Use adequate general and local exhaust ventilation to maintain exposure levels below that occupational exposure limits.

Personal Protection:

Eye Protection: Safety goggles recommended where eye contact is possible.

Skin Protection: Wear chemical resistant gloves.

Respiratory Protection: None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

Work/Hygiene Practices: Wash with soap and water after handling.

MSDS CONTENTS



SECTION 9: Physical and Chemical Properties

9 – Physical and Chemical Properties

Boiling Point:	361 - 369°F (183 - 187°C)	Specific Gravity:	0.8 – 0.82 @ 60°F
Solubility in Water:	Insoluble	pH:	Not Applicable
Vapor Pressure:	95-115 PSI @ 70°F	Vapor Density:	Greater than 1
Percent Volatile:	70-75%	VOC:	412 grams/liter (49.5%)
Coefficient of Water/Oil Distribution:	Not Determined	Appearance/Odor	Light amber liquid/mild odor
Flash Point:	122°F (49°C) Tag Open Cup (concentrate)	Flammable Limits: (Solvent Portion)	LEL: 0.6% UEL: 8.0%
Pour Point:	-63°C (-81.4°F) ASTM D-97	Kinematic Viscosity:	2.79-2.96cSt @ 100°F



MSDS CONTENTS



■ SECTION 10: Stability and Reactivity

10 – Stability and Reactivity

Stability: Stable

Hazardous Polymerization: Will not occur.

Conditions to Avoid: Avoid heat, sparks, flames and other sources of ignition. Do not puncture or incinerate containers.

Incompatibilities: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide and carbon dioxide.



MSDS CONTENTS



■ SECTION 11: Toxicological Information

11 – Toxicological Information

The oral toxicity of this product is estimated to be greater than 5,000 mg/kg based on an assessment of the ingredients. This product is not classified as toxic by established criteria. It is an aspiration hazard. None of the components of this product is listed as a carcinogen or suspected carcinogen or is considered a reproductive hazard.

■ SECTION 12: Ecological Information

12 – Ecological Information

No data is currently available.



MSDS CONTENTS



■ SECTION 13: Disposal Considerations

13 - Disposal Considerations

If this product becomes a waste, it would be expected to meet the criteria of a RCRA ignitable hazardous waste (D001). However, it is the responsibility of the generator to determine at the time of disposal the proper classification and method of disposal. Dispose in accordance with federal, state, and local regulations.

■ SECTION 14: Transport Information

14 – Transportation Information

DOT Surface Shipping Description: Consumer Commodity, ORM-D
IMDG Shipping Description: Un1950, Aerosols, 2.1, LTD QTY



MSDS CONTENTS



■ SECTION 15: Regulatory Information

15 – Regulatory Information

U.S. Federal Regulations:

CERCLA 103 Reportable Quantity: This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

SARA TITLE III:

Hazard Category For Section 311/312: Acute Health, Fire Hazard, Sudden Release of Pressure

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III

Section 313 Reporting requirements: None

Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): This product does not contain chemicals regulated under California Proposition 65.

VOC Regulations: This product complies with the consumer product VOC limits of CARB, the US EPA and states adopting the OTC VOC rules.

Canadian Environmental Protection Act: One of the components is listed on the NDSL. All of the other ingredients are listed on the Canadian Domestic Substances List or exempt from notification.

Canadian WHMIS Classification: Class B-5 (Flammable Aerosol)

This MSDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

MSDS CONTENTS



- SECTION 16: Other information
 - including date of preparation or last revision

16 – Other Information:

HMIS Hazard Rating:

Health – 1 (slight hazard), Fire Hazard – 4 (severe hazard), Reactivity – 0 (minimal hazard)

SIGNATURE:  _____

TITLE: Director of Global Quality Assurance

REVISION DATE: March 2010

SUPERSEDES: August 2009

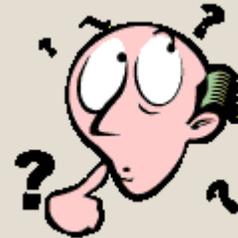
MSDS EXAMPLE EXERCISE

- Common name?
- Physical description?
- Hazardous chemicals?
- Physical hazards?
- Health hazard?
- First aid?
- PPE needed?
- Special precautions?
- Fire hazards?
- Reactivity hazards?
- Spill handling procedures?

 MATERIAL SAFETY DATA SHEET Unleaded Gasoline VALERO MARKETING & SUPPLY COMPANY and Affiliates P.O. Box 896000 San Antonio, TX 78288-8000	
Emergency Phone Numbers 24 Hour Emergency: 866-555-5220 Chemtrec Emergency: 800-424-9300	General Assistance: 210-345-4593
BRAND NAMES: Valero, Diamond Shamrock, Shamrock, Ultramar, Beacon, Total	
Section 1. Chemical Product and Company Identification	
Common / Trade name	: Unleaded Gasoline
Synonym	: Regular/Premium/Midgrade - Unleaded Gasoline, Petrol, Motor Fuel, Reformulated Gasoline, RFG, Conventional, Oxygenated, Non-Oxygenated, CARB Gasoline
SYNONYMS/COMMON NAMES: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical specifications vary greatly depending on the product and are not reflected in this document. Consult specification sheets for technical information. This product contains ingredients that are considered to be hazardous as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).	
Material uses	: Motor Fuel
MSDS #	: 002
CAS #	: 86290-81-5
Section 2. Hazards Identification	
Danger: Contains Benzene. Cancer Hazard: Can cause kidney, liver and blood disorders. May cause irritation to eyes, skin and respiratory system. Avoid liquid, mist and vapor contact. Harmful or fatal if swallowed. Aspiration hazard; can enter lungs and cause damage. May cause irritation or be harmful if inhaled or absorbed through the skin. Extremely flammable liquid. Vapors may explode.	
Physical state	: Liquid.
Emergency overview	: Danger! EXTREMELY FLAMMABLE LIQUID AND VAPOR. FLAMMABLE. VAPOR MAY CAUSE FLASH FIRE. CAUSES SKIN IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. Do not ingest. Avoid prolonged contact with eyes, skin and clothing. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.
Route of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects	
Eye	: May cause severe irritation, redness, tearing, blurred vision and conjunctivitis.
Skin	: Prolonged or repeated contact may cause moderate irritation, defatting (cracking), redness, itching, inflammation, dermatitis and possible secondary infection. High pressure skin injections are SERIOUS MEDICAL EMERGENCIES . Injury may not appear serious at first. Within a few hours, tissues will become swollen, discolored and extremely painful.

KNOWLEDGE REVIEW

- Why do we need the Hazard Communication program?
- What are labels important?
- When must a label be replaced?
- What is an MSDS?
- Describe 6 sections found in an MSDS?
- Where can MSDS be found?



ANY QUESTIONS?

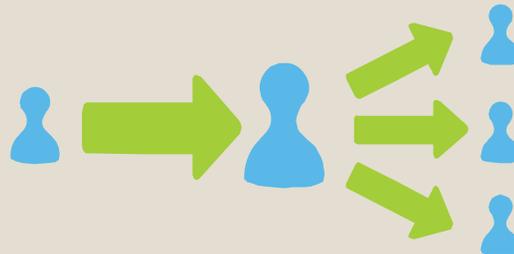


HAZARDOUS MATERIAL INCIDENT RESPONSE

- OSHA's 29 CFR 1910.120 Hazardous Waste Operations & Emergency Response (HAZWOPER) standard is designed to protect five groups of workers – those engaged in:
 - Clean-up operations conducted at uncontrolled hazardous waste sites;
 - Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act (RCRA);
 - Voluntary clean-up operations at uncontrolled hazardous waste sites;
 - Operations involving hazardous wastes that are conducted at treatment, storage, and disposal facilities regulated by RCRA; and
 - ***Emergency response operations for releases of, or substantial threats of releases of, hazardous materials regardless of the location of the hazard.***

5 LEVELS AND MODES OF EMERGENCY RESPONSE

- First Responders Awareness (FRA) level responders and Operations (FRO) level responders take DEFENSIVE actions.
- HAZMAT Technicians and Specialists take OFFENSIVE actions.
- The Incident Commander coordinates the response and is ultimately responsible for safety.



FIRST RESPONDER AWARENESS

- Awareness Level First Responders, also known as FRA Level 1 responders, are responsible for ONLY the following:
 - Recognizing or suspecting the presence of hazardous materials or an emergency release
 - Identifying the hazardous substance (if possible)
 - Protecting themselves
 - Calling for appropriate assistance
 - Securing the area (if directed and trained to do so)

PROTECTIVE ACTIONS

- Precautions to protect yourself and others in a hazardous materials release incident:
 - Approach an incident from upwind and uphill
 - Upwind always takes priority
 - If you cannot approach from upwind stay further away
 - Look for all hazards at a safe distance
 - Relay hazards and safety information to others
 - Avoid direct contact with the material, its gases, vapors or smoke from any fire

INCIDENTAL RELEASE OR EMERGENCY RESPONSE RELEASE?

- Not all releases of hazardous materials will require initiating emergency response efforts.
- An **incidental release** is a non-emergency release of a hazardous substance since the substance can be absorbed, neutralized, or otherwise controlled at the time of release by staff in the immediate release area.
 - Such releases are:
 - Limited in quantity, exposure potential, or toxicity, and
 - Present minor safety or health hazards to workers in the immediate work area or those assigned to clean them up.



INCIDENTAL RELEASE OR EMERGENCY RESPONSE RELEASE?

- Hazardous materials **emergency response releases** are the opposite of incidental releases, as they:
 - Pose a significant safety or health hazard to workers in the immediate vicinity or to the volunteer cleaning it up,
 - Have the potential to become an emergency within a short time frame, or
 - Cannot be absorbed, neutralized, or otherwise controlled at the time of the release by staff in the immediate release area.



EMERGENCY RESPONSE ACTION

- Once you determine that a release is not incidental and calls for an emergency response, you must initiate the notification process.
 - This process is spelled out in HHW Program Site Safety & Health Plan.
- At each collection site, become familiar with:
 - Who you are to notify if you find a spill
 - How you will be notified of need to evacuate
 - Where you are to evacuate to
 - When you will be allowed to leave



EMERGENCY RESPONSE ACTION

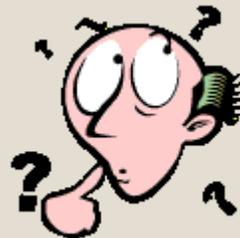
■ Remember:

- The most prudent action to take when dealing with an unknown substance is to assume the worst.
- Avoid contact with hazardous material releases.
- Keep unauthorized individuals away from any real or suspected emergency hazardous material release.
- Follow all instructions given by emergency responders.



KNOWLEDGE REVIEW

- What kind of responders are volunteers?
- What is an incidental release?
- What is an emergency response release?
- What should you do if there is an emergency response release?
- When may you leave the evacuation area?



ANY QUESTIONS?



GENERAL SAFETY PRACTICES



COLLECTION SITE HAZARDS



- Unintended exposure to hazardous materials presents the most frequent and obvious risk to HHW volunteers, however other potential sources of injuries include:
 - **PHYSICAL HAZARDS** such as: slipping or tripping, being struck by motor vehicles, items falling onto feet or smashing fingers, being cut by sharp items, use of damaged tools, incorrect and over-lifting,
 - **BIOLOGICAL HAZARDS** such as: unexpected contact with insects, snakes, vermin, and participants' pets, and
 - **THERMAL HAZARDS** such as: heat illness, sunburn, and fatigue.
- Volunteers must be trained to recognize these hazards in order to prevent injuries and illness.

SAME-LEVEL FALL HAZARDS

- While falls to the same level usually result in less-serious injuries, they occur much more frequently than falls from a height to a lower level.
- Reasons for same-level falls slipping and tripping due to:
 - Poor housekeeping and unsafe floor maintenance.
 - Improper equipment and materials storage.
 - Inadequate lighting or suddenly changes in light intensity.
 - Incorrect footwear.
 - Not looking where walking.
 - Carrying oversized objects obstructing view of travel.
 - Walking too fast, running or changing direction quickly.
 - Wearing sunglasses in low light areas.



HOUSEKEEPING



- Maintain the workplace in a clean and orderly condition.
 - This may be accomplished by “cleaning as you go”.



FLOOR HOUSEKEEPING

- Stored items, wastes and any other debris must be kept cleared from work areas, passageways, in and around buildings.
- Maintain floors in a clean, dry and trip-free condition.
- In areas where wet floor conditions could exist (e.g. pouring areas) ensure proper prompt clean-up is provided.



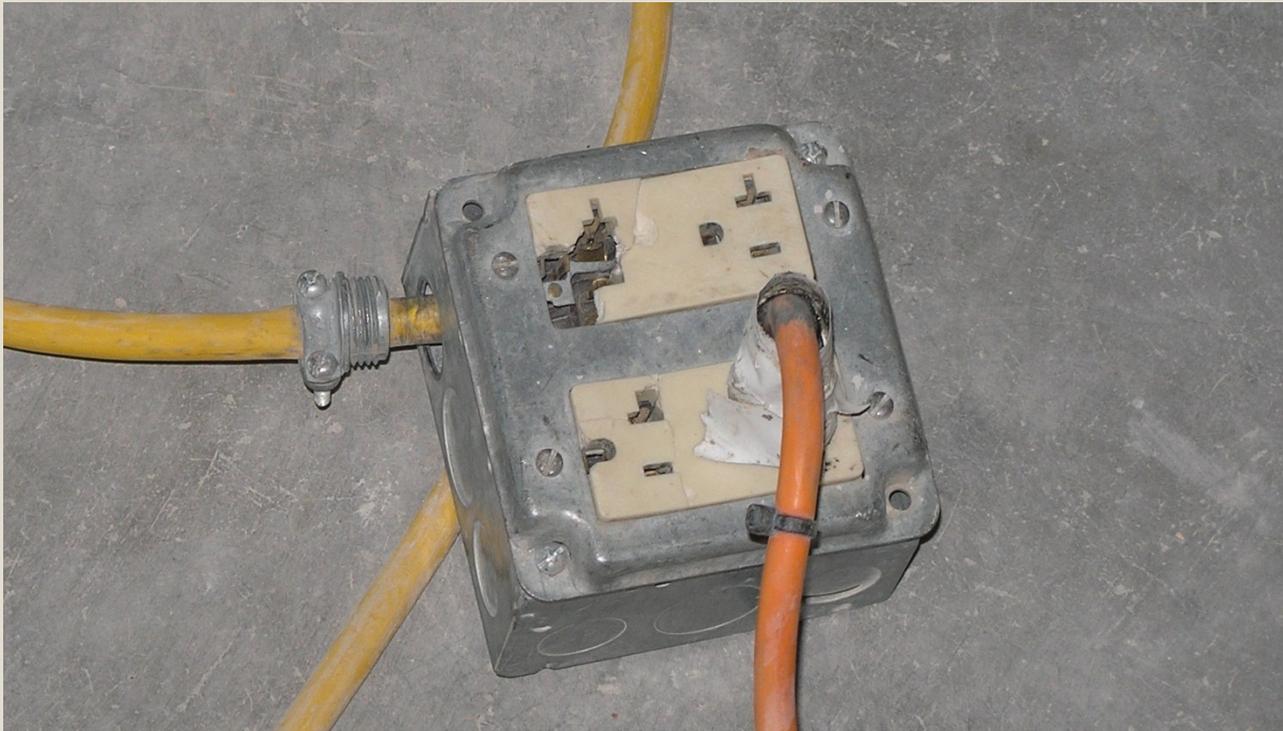
SAFE EQUIPMENT & MATERIALS

- Never use any machinery, equipment, tools or materials that are damaged, defective or otherwise not in compliance with manufacturer specifications.
 - Includes volunteer-owned items brought into the workplace.



SAFE TOOLS

- Equipment must be installed and used in accordance with any instructions included in the listing or labeling.



SAFE TOOLS

- The wooden handles of tools must be free of splinters or cracks and kept tight in the tool.



SAFE TOOLS

- Power tools and machinery designed to have guards must be used with the guards functioning



SAFE EQUIPMENT & MATERIALS

- Identify damaged or defective items as unsafe by:
 - tagging them “do not use” or similar,
 - locking or otherwise rendering them inoperable, or
 - physically remove the items from the work area.



LOCKOUT / TAGOUT

- Lockout/Tagout is used to prevent unexpected energization, start-up or release of stored energy to protect injury to staff and volunteers.
 - Locks and tags are used to identify and prevent activation of machines that are being serviced or repaired.



FLAMMABLE LIQUIDS SAFETY

- Flammable liquids may be used only where there are no open flames or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance.



FLAMMABLE LIQUIDS SAFETY

- Where flammable or combustible liquids are used or handled, means must be provided to dispose promptly and safely of leakage or spills.



FIRE PREVENTION

- Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.



FIRE PREVENTION

- Oxygen cylinders in storage must be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.



FIRE EXTINGUISHERS

- Portable fire extinguishers are required by fire code and must be mounted, identified, and located so that they are readily accessible (unblocked) for use.



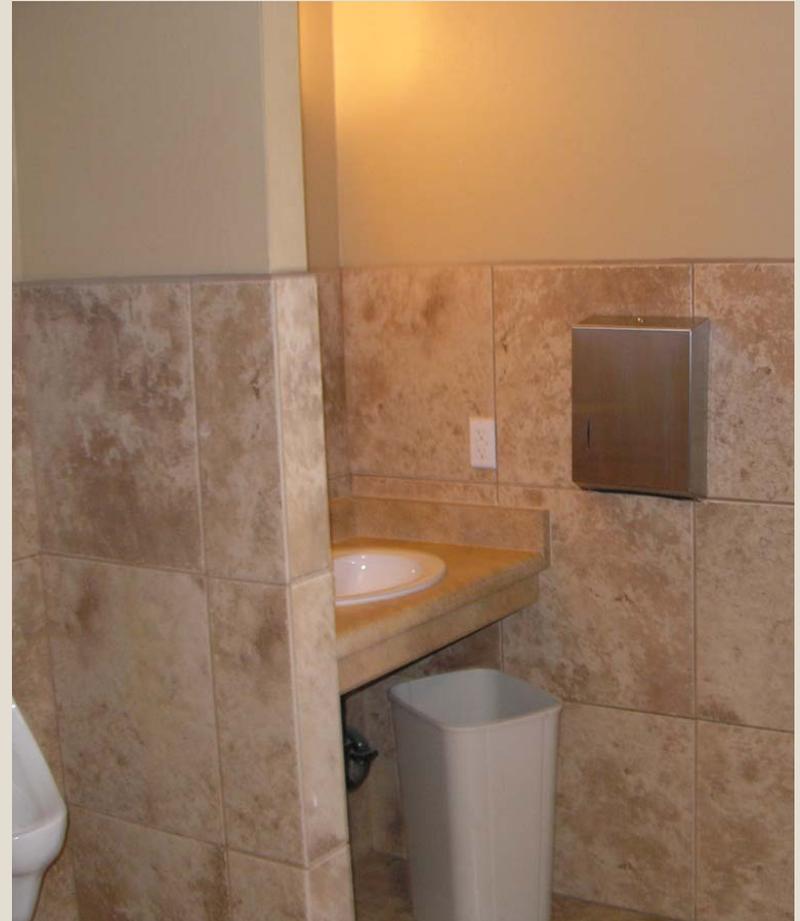
EMERGENCY FLUSHING FACILITIES

- If volunteers eyes or skin could come in contact with corrosive chemicals (e.g. bleach), quick flushing such as bottled eyewash solution, a tank style station, plumbed fountain or emergency shower must be available.



RESTROOM FACILITIES

- Sufficient toilet facilities for male and female volunteers must be provided with:
 - Hot and cold water,
 - Hand soap, and
 - Individual hand towels or air blowers.
- Restroom facilities must be regularly cleaned as well as maintained in dry and sanitary condition.



POTABLE WATER

- An adequate supply of potable water must be provided in a clearly marked container capable of being tightly closed and equipped with a tap.
 - NO common drinking cups or igloos allowed!



MANAGING FATIGUE

- In general, you should take a rest break every hour and eat and drink something.
 - Under extreme heat conditions, you may need to take additional breaks.
- If you become fatigued, notify your Site Commander and take an extended break or leave the collection event.
 - You do not need to stay until the end of the event.



PREVENTING SUNBURN

- Sunlight exposure is highest during the summer and between 10:00 a.m. and 4:00 p.m.
 - Workers are at risk of UV radiation even on cloudy days.
 - Many drugs increase sensitivity to sunlight and the risk of getting sunburn.



PREVENTING SUNBURN

- Volunteers should take the following steps to help prevent sunburns:
 - Wear sunscreen with a minimum of SPF 15 and follow the application directions on the sunscreen bottle.
 - Sunscreens should be liberally applied (a minimum of 1 ounce) at least 20 minutes before sun exposure and include the ears, scalp, lips, neck and backs of hands.
 - Sunscreens should be reapplied at least every 2 hours or more frequently.
 - Wear appropriate clothing.



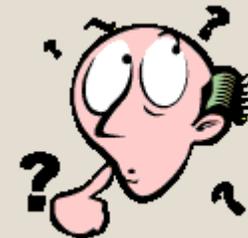
EMERGENCY PROCEDURES



- In order to maximize safety and prevent repetitions all volunteers (and staff) are required to report any, whether minor or suspected, accident, injury, illness, and/or property damage to the site coordinator immediately.
- Detailed emergency procedures are listed in the HHW Program Site Safety & Health Plan that is maintained at every collection facility and remote event.
- Volunteers are allowed and encouraged to review the SSHP at any time during a collection event.

KNOWLEDGE REVIEW

- List three ways to prevent slips/trips/falls.
- Describe good housekeeping.
- List three safety rules for tools and/or equipment.
- Describe an example of machine guarding.
- Explain “lockout/tagout” and why it is important.
- List three types of required emergency equipment.
- Explain what to do if you feel fatigued.
- List two ways to prevent sunburns.



ANY QUESTIONS?



SW DESERT REPTILE & INSECT HAZARDS



WHAT DESERT PESTS?

- The southwest desert is the home to all variety of reptiles and insects - all of which are beneficial, but some of which can be hazardous to humans.
- These hazardous inhabitants, or so called “pests”, create a unique problem for workers required to perform jobs in what each considers to be their own backyard.
- Examples of such pests are:
 - Rattlesnakes
 - Black Widows and Scorpions
 - Mosquitos and Africanized bees



HAZARDOUS SNAKES

- The vast majority of snakes are harmless to humans, although a number are capable of inflicting serious injury with their venomous bites.
 - Snakes are most active between April and October.
 - About 45,000 snake bites occur each year in the U.S. on average
 - 7000-8000 are by venomous snakes
 - 10-15 fatalities occur on average
 - Approximately ½ of all snake bites classed as “illegitimate” -- bites occurred handling or



VENOMOUS SNAKES IN ARIZONA

- All species of venomous snakes in Arizona possess offensive venom used for subduing prey.
 - There are over a dozen species of rattlesnakes found in Arizona.
 - They have folding, hollow fangs, which inject the venom deep into the victim,
 - Rattlesnake venom is a hemotoxin, which destroys blood & walls of blood vessels, and the toxicity varies between species.
 - One species of coral snake.
 - The coral snake is small and shy, but has potent venom.
 - Several species of rear-fanged snakes.
 - These snakes are small, have mild venom, and present little threat to people.



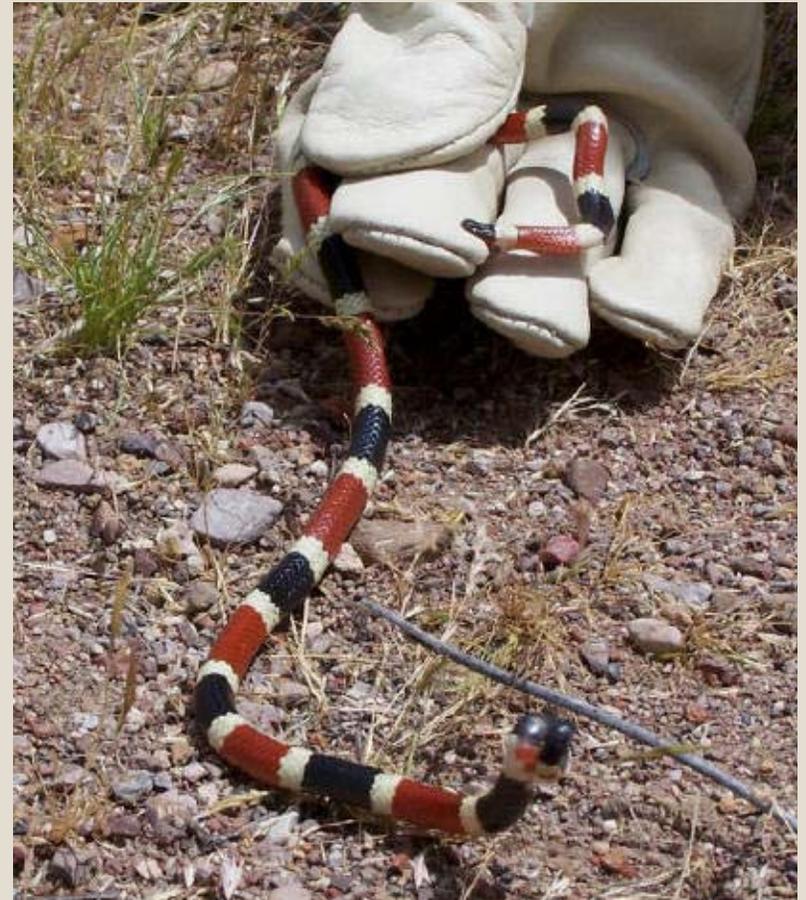
AZ RATTLESNAKES

- The western diamondback is the largest species of rattlesnake in Arizona and the most commonly encountered.



AZ CORAL SNAKE

- Arizona Coral Snake venom is more potent than that of rattlesnakes - however this small, shy and quick moving snake that has very small fangs and carries little venom.



SNAKE BITES

- A snake's striking distance is about 1/2 the total length of the snake.
- 85% of the natural bites are below the knee.
- 50% of the bites are "dry" or without venom injection.
 - Injecting venom is a voluntary and it is suspected that against humans defensive actions, injected



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SNAKE BITES

- Bites from rattlesnakes are not uncommon, but deaths resulting from their bites are.
 - The western diamondback rattlesnake is responsible for most of the bites in the U.S. and therefore most of the deaths.
 - The Mojave rattlesnake, commonly found in Arizona, is considered to be the most toxic species of rattlesnake in the U.S.
- Rattlesnake bites are typically very painful and may cause severe swelling.



WHAT TO DO IF BITTEN?

- Try to note the color and shape of the snake.
- Treat all bites as poisonous – Call 9-1-1 or seek medical assistance immediately!
- Keep the person calm and as still as possible
- Remove all jewelry
- Wash the bite wound with soap and water
- Cover the wound with a clean dressing
- Immobilize limb below the heart
- Perform CPR if necessary



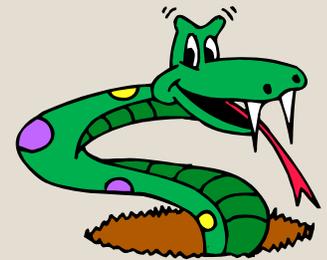
OUTDATED BITE TREATMENTS

- Often field treatments by untrained personnel result in damage to victim or by the person applying treatment
 - **DO NOT:**
 - Apply tourniquets
 - Cut the wound open
 - Suck out venom by mouth or other means
 - Administer pain medication
 - Apply any chemicals or medications
 - Have the person run or otherwise exert themselves



SNAKE BITE PREVENTION

- Watch where you place your hands and feet when working.
 - Do not blindly reach into boxes, debris, flip over rocks, etc.
- Most snakes will only bite when startled, provoked, threatened, or cornered.
 - Do not attempt to kill or handle snakes.
- Avoid snakes appearing to be dead.
 - They often use this as a defense mechanism
- **Don't bother snakes and they won't bother you!**



BLACK WIDOW SPIDERS

- Black Widows are common throughout the Sonora Desert and prefer warm dark areas with little traffic.
 - They are nocturnal, preying on pests such as crickets, flies, moths, small reptiles and roaches.
 - They seldom make their homes inside houses or offices, but are often found in storage sheds, woodpiles, unused machinery, trash containers, debris piles, and similar dark quiet places outside.



BLACK WIDOW VENOM

- Only the female Black Widow is venomous, and is usually identified by the orange hour-glass mark on the bottom of her abdomen and an extremely messy web.
 - Black Widow spiders change their appearance as they mature.



BLACK WIDOW BITES

- Black Widow venom is a potent neurotoxin used to immobilize their prey, and the spider will only bite humans if startled, agitated or directly threatened.
- Bites usually results in uncomfortable but not life-threatening symptoms, such as: two small holes, pinprick or burning sensation, localized redness or bulls-eye, swelling, pain and cramping, then pain throughout the body, stomach cramping, nausea, increased blood pressure, headache, anxiety, tinnitus, and a general feeling of illness that may last for several days.



BITE FIRST AID

■ If bitten by a Black Widow:

- Immediately and thoroughly wash the spot with soapy water, then ice it down, take a NSAIDs for pain relief, and rest as needed.
- If the area becomes additionally inflamed, oozy or infected within days after the bite, go and get medical attention.
- If trouble breathing develops, call 9-1-1 immediately as there may be an allergic reaction to the bite.



BLACK WIDOW PREVENTION

- If you're in an area known to host Black Widows:
 - Develop the habit of shaking out clothes, socks, and shoes before putting them on.
 - Wearing long sleeves and gloves if you need to move around in suspicious areas such as woodpiles is also an excellent idea.
 - Get rid of trash and rubbish such as old cardboard boxes and stacks of old newspaper.
 - Use spider spray to immobilize and kill the spider.
 - Never play with or attempt to catch a Black Widow spider.
 - **Don't bother Black Widows and they won't bother you!**



SCORPIONS

- Of the many species of scorpions found in Arizona, only the Bark Scorpion is regarded as life-threatening.
 - This highly poisonous scorpion is small, one to two inches long, light tan with slender pincers and tail.



SCORPION HIDING PLACES

- Like reptiles, scorpions become active during the warm weather months of April to October, and use their venom to disable prey.
- Many scorpions are nocturnal, and during daylight hours are usually found outside in dark places clinging upside down on rocks, bark, fallen cactus and trash.
- Scorpions also like to stay indoors during daylight hours, hiding under furniture and in closets, beds and shoes.



SCORPION STINGS

- Scorpions, like snakes and spiders, will generally will not sting unless they are stepped on, agitated or threatened.
- Scorpion stings are quite often very painful, but the majority do not require special medical treatment.
- A scorpion sting feels like being hit with a hot needle.
- Localized pain, numbness and tingling may develop and last several minutes to days.
- The injured area may also become touch, pressure,



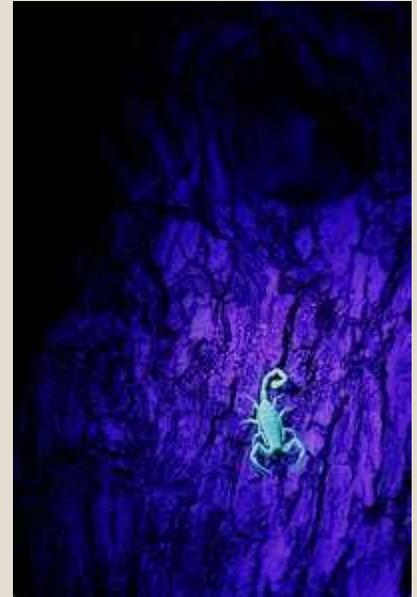
STING FIRST AID

- Most stings may be treated with first aid including:
 - Cleaning the site with soap and water, applying a cool compress, and taking Tylenol or NSAIDs as needed.
- Call 9-1-1 if any of the following occur:
 - difficulty breathing
 - uncontrolled jerking
 - drooling
 - wild eye movements.



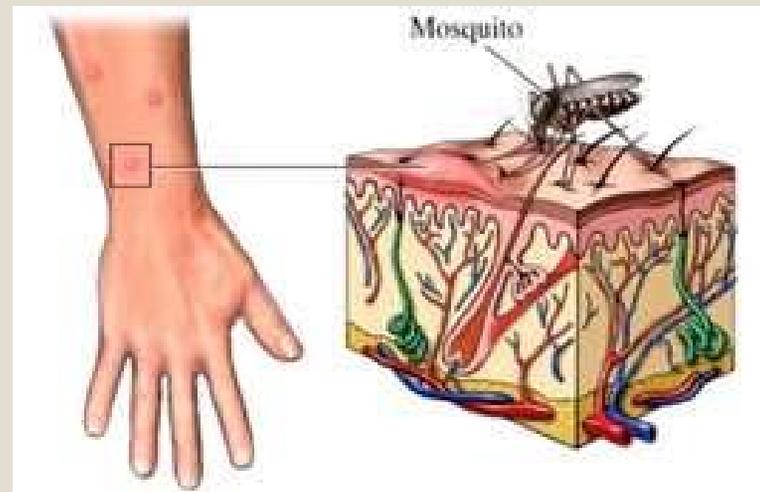
SCORPION PREVENTION

- To prevent unwanted and unexpected contact with scorpions,
 - Keep doors, windows, cracks in buildings and other holes into buildings “gap-free” and closed as often as possible.
 - At night, “black lights” may be used to locate scorpions as they fluoresce under UV light.
 - It is always recommended to shake out clothing and shoes left outside overnight.
- **Don't bother Scorpions and they won't bother you!**



MOSQUITOS

- There are over 40 different species of mosquitoes in Arizona.
 - Most are nuisance pests only and do not transmit disease, yet some species exist that can transmit a number of disease-causing organisms to humans and animals.
 - In Arizona the diseases these organisms cause includes: encephalitis, dengue fever, and West Nile virus.



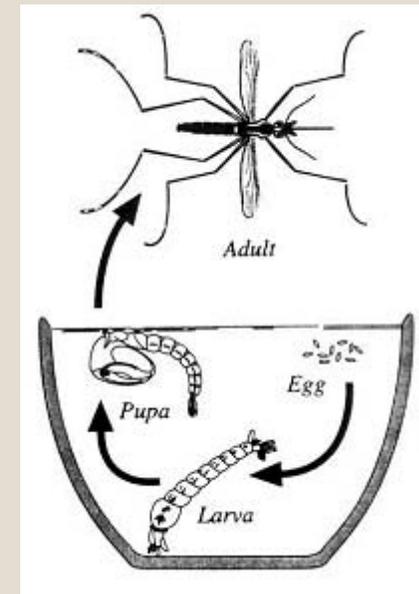
MOSQUITO BITES

- Female mosquitoes require a blood meal for egg production, and they produce a painful bite as they feed.
- The bites often result in annoying localized swelling and itching.
- Basic first aid will keep mosquito bites from becoming infected.
 - Wash bites with soap and water.
 - Resist the desire to scratch.
 - Oral antihistamines and lotions can reduce the itch from mosquito bites.
- If breathing difficulties develop after a bite, call 9-1-1.



BITE PREVENTION

- Since mosquitoes need water to complete their life cycle, a mosquito problem can develop just about anywhere that water collects.
 - Businesses and home owners can do much to control and prevent unwanted stagnant water mosquito breeding sites, but personal protection is necessary when working out doors.



PERSONAL PREVENTION

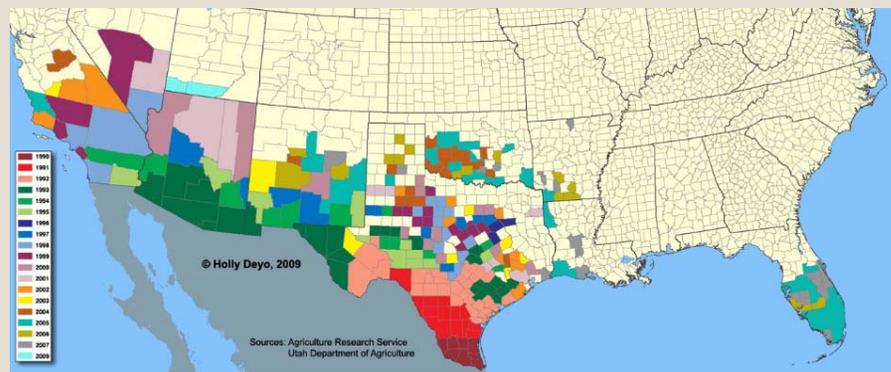
- Some personal protection from mosquitoes can be achieved through the use of insect repellents.
 - Many of these products contain DEET (N,N-diethyl-m-toluamide).
 - Select the desired formulation (e.g. lotion, aerosol spray or cream) and apply it to exposed skin or clothing.
 - Repeated use of repellents over a short period of time (several days) may not be recommended.
 - Some individuals may be sensitive to DEET - discontinue skin application if irritation occurs.
 - Certain insect repellants contain insecticides and are only suitable for application to clothing and not to the skin.
 - Read directions carefully.





AFRICANIZED HONEY BEES

- Africanized honey bees, or so-called “killer bees”, were first introduced into Brazil in 1956 in an attempt to improve honey production in the tropics.
- They were accidentally released into the wild, and have been moving slowly towards the U.S. ever since.
- A few colonies were found in Texas as early as 1990.
- They entered Arizona in 1993, along the southern border, and are found throughout the state today.



AFRICANIZED VS EUROPEAN BEES

- Africanized and European bees both:
 - Pollinate flowers and produce honey and wax.
 - Can only sting once and the sting has the same toxicity.
 - **Can not** be told apart by looking at them.
- The way the two types of bees behave and defend their colonies is what sets them apart.



AFRICANIZED BEES

- Unlike European bees which like enclosed structures for their hives, Africanized bees will live about anywhere they can find shelter.
 - This means that Africanized bees are more likely to be found in trees, in the sides of buildings, in drain pipes, in water meter valve boxes, in old abandoned appliances, in piles of junk, and even in holes in the ground.
 - They also swarm frequently to establish new nests and move their entire colony readily if food is scarce.



AFRICANIZED BEES

- Africanized bees are very protective of their colony.
 - If someone gets too near a hive, some bees may become disturbed and react by stinging them.
 - They can sense a threat 50 feet or more from their nest.
 - They are bothered by loud noises and vibrations from power equipment 100 feet or more from nest.
 - Respond more quickly and more bees sting.
 - May pursue a perceived enemy 1/4 mile or more.



PREVENTING BEE ATTACKS

- Be alert for danger - remember that all bees sting to defend their colony, so be on the look out for honey bee swarms and established colonies.
 - Look for bees in holes in the ground, trees or cacti, and in sheds.
 - Be alert for bees coming in and out of an opening such as a crack in a wall, or the hole in a water meter box.
 - Be extra careful when moving felled trees, equipment and other junk that has been lying around.
 - Listen for the hum of an active bee colony.



PREVENTING BEE ATTACKS

- Be alert for bees that are acting strangely.
 - Quite often bees will display some preliminary defensive behavior before going into a full-fledged attack.
 - They may fly at your face or buzz around over your head.
 - These warning signs should be heeded, since the bees may be telling you that you have come into their area and are too close to their colony for comfort both theirs and yours!



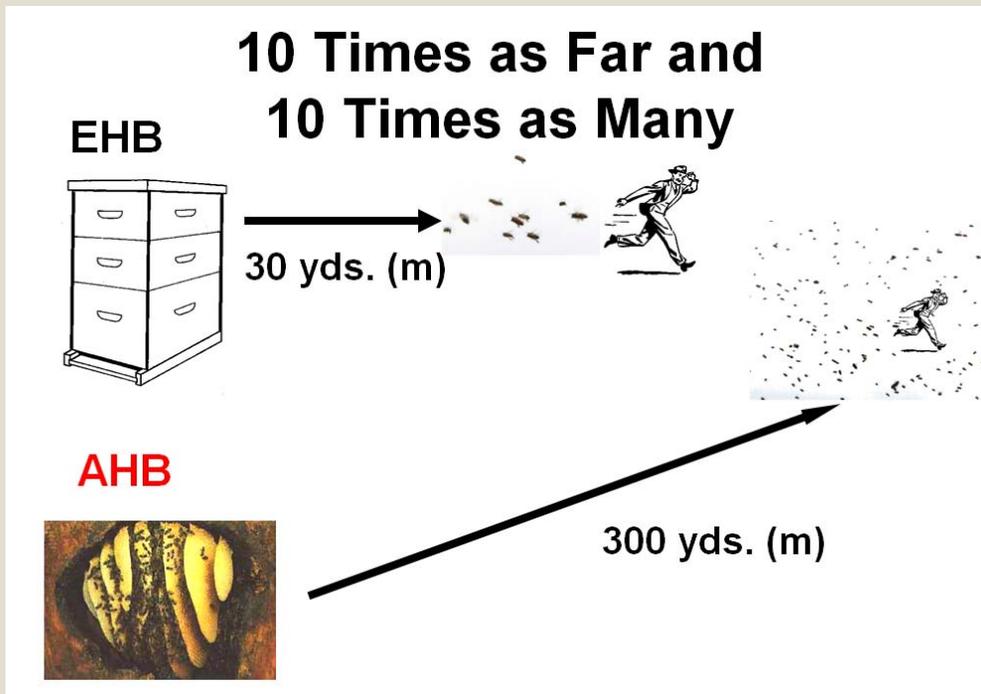
IDENTIFYING HAZARDS

- Aerial Nest are Dangerous!
 - When comb is present outside expect bees to be VERY DEFENSIVE.
- These are not swarms.



BEE ATTACKS

- Africanized bees defend their colonies by sending out much larger numbers of defenders who will travel much farther and sting more aggressively in greater numbers than European bees.



BEE ATTACKS

- Africanized bees will continue to be highly defensive for up to 24 hours after the initial disturbance.
- They will attack any person or pet within 150 feet of the colony site.
- Pest control professionals are usually not prepared to subdue an agitated, highly defensive bee colony.
- However, destroying an agitated colony is essential for public safety.



WHAT TO DO IN A BEE ATTACK

- Once the bees start to attack, the most important thing to do is RUN away as fast as possible.
 - Do not try to retrieve belongings nearby.
 - Do not try to stand still in an attempt to fool the bees.
 - Do not try to fight the bees - the more you flail your arms, the madder they get.
- Run indoors or into a vehicle as fast as possible.
 - A bee can obtain speeds of from 12 to 15 miles per hour, but most healthy humans can outrun them.
 - Africanized bees have been known to follow people for over $\frac{1}{4}$ mile.



WHAT TO DO IN A BEE ATTACK

- Any covering for your body, and especially for your head and face will help you escape.
 - The bees will intentionally sting your face and eyes.
 - Any impairment of your vision will make it more to escape.
 - Grab a blanket, a coat, a towel, anything that will give you momentary relief while you look for an avenue of escape.
 - If you have nothing else, pull your shirt up over your face.
 - The stings you may get on your chest and abdomen are far less serious than those to the facial area.



WHAT TO DO IN A BEE ATTACK

- Try to find shelter as soon as possible.
 - Get inside a building or a car with the windows and doors closed.
 - Some bees are bound to enter with you, but at least there won't be an entire colony there trying to sting you.
- Never Jump Into Water!
 - The bees will wait for you to come up for air.



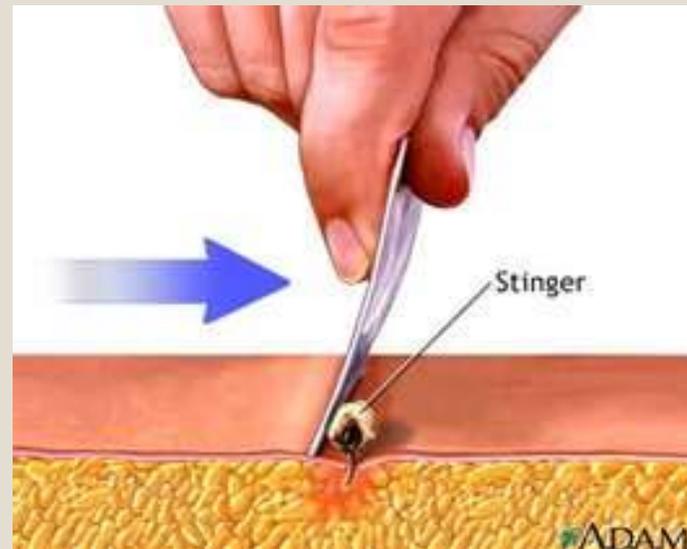
BEE STING HAZARDS

- The three greatest risks from bee stings are:
 - Allergic reaction, which could be fatal in less than 30 minutes,
 - Toxic response from a massive envenomation, +10 stings per lb. body weight is potentially lethal.
 - Infection, which is uncommon and normally less serious.



BEE STING TREATMENT

- Bee stings (less than 15 and without allergic reaction) normally require the same basic first aid used for centipede and mosquito bites.
 - Remove the stinger using a sweeping motion – do pull out using fingers or tweezers.



BEE STING TREATMENT

- Call 9-1-1 for any of the following symptoms, because they indicate an allergic reaction:
 - Large areas of swelling
 - Abnormal breathing
 - Tightness in throat or chest
 - Dizziness or fainting
 - Nausea or vomiting
 - Hives, persistent swelling or pain



KNOWLEDGE REVIEW

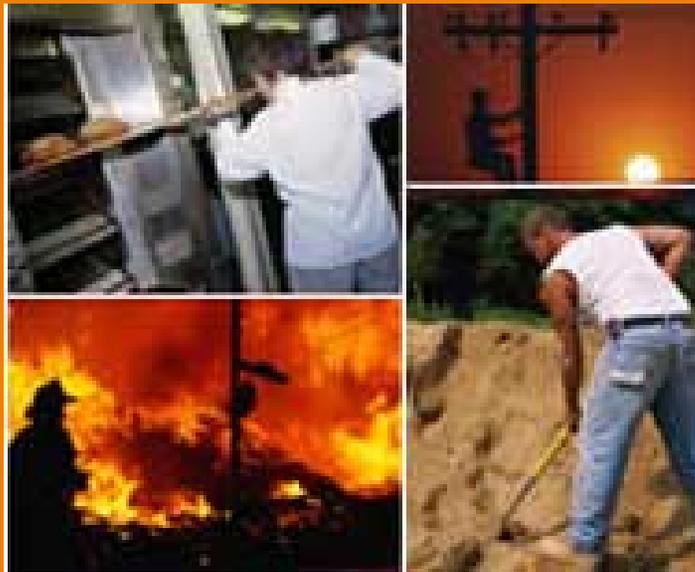
- Name the most common venomous snake in Arizona?
- Name 3 venomous insects in Arizona?
- What are 3 ways to prevent snake bites?
- What are 3 ways to prevent bee stings?
- Describe what to do for snake bites?
- Describe first aid for non-allergic bee stings?
- What is the best way to prevent all bites & stings?
- When must you call 9-1-1?



ANY QUESTIONS?



HEAT STRESS AWARENESS



WHY CARE ABOUT HEAT STRESS?

- On average, over 384 people die each year from heat stroke.
 - Heat-related illness seems to occur most often with the elderly, infants, people who are not in good physical condition or are not acclimatized to the heat.
- Describe the workers most affected heat:
 - Most fatalities & non-fatal illnesses involved **men**.
 - Predominant ages affected: **25 - 55** years old.
 - Most illnesses occurred between **noon and 4 pm**.
 - Most common worker activities were agriculture, construction, materials handling, operating equipment, and other physical work.
- Tucson averages 55 days per year at or above 100°F.



WHAT IS HEAT STRESS?

- Working or playing where it is **HOT** puts **STRESS** on our body's cooling system.
- When the heat is combined with other stresses such as hard physical work, loss of fluids, inappropriate diet, heavy clothing, medicines and/or some health conditions, it may lead to heat-related illness, disability and even death.
- This can happen to anybody - even someone who is young and fit.

WHERE DOES THE HEAT COME FROM?

- The human body continually generates heat and passes it to the environment.
 - There are two main ways our bodies produce heat:
 - Metabolic Heat: the body generates heat through the digestion of food, and by performing work and exercise.
 - Environmental Heat: the body absorbs heat from the surrounding environment, whether from the sun, a hot room or heat generating equipment.
 - The harder your body is working, the heat it needs to release.



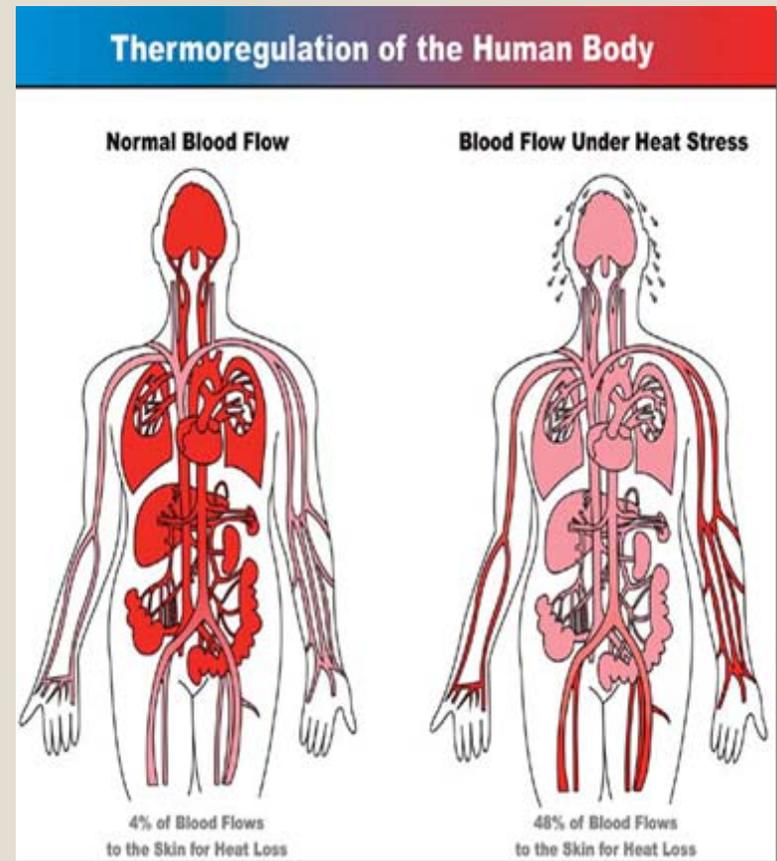
HOW DO WE COPE WITH HEAT?

- There are three methods by which our bodies can be cooled:
 - Radiation: heat emitted from the body surface.
 - Evaporation: a process during which body heat is released when a liquid changes to a vapor.
 - Convection: the transfer of heat through the circulation of air.
- When the environment is hot, humid, and/or there is a source of radiant heat (for example, a furnace or the sun), it is harder for the body to release excess heat.



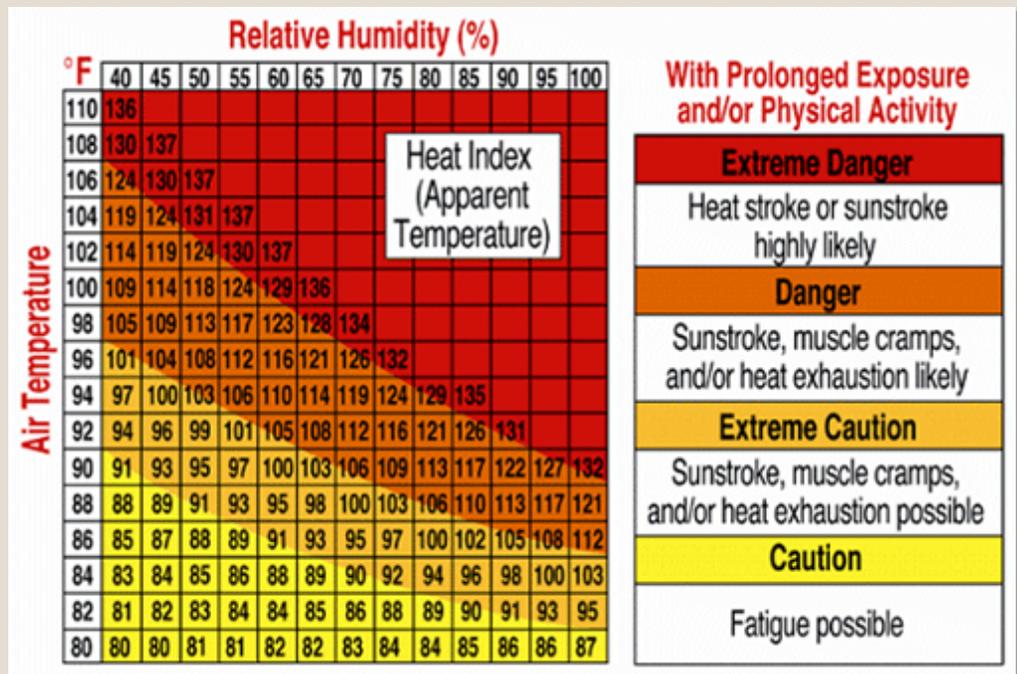
HOW DO WE COPE WITH HEAT?

- When body core temperature rises:
 - Heart rate increases
 - Blood vessel dilate
 - Blood flow to the skin increases
 - Sweating increases
 - Cooled blood returns to core
- When this process works, core body temperature drops and stabilizes at a safe level.



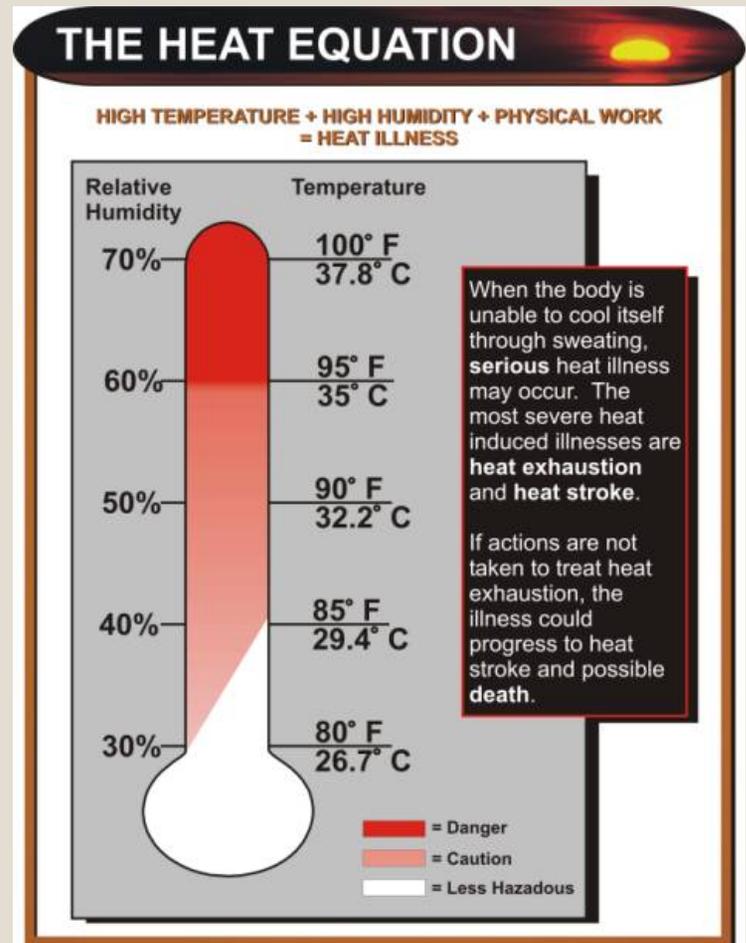
HEAT INDEX

- The heat index is the “what it feels like” or apparent atmospheric temperature given a certain humidity.
- To use a heat index chart:
 - Locate the current high temperature on the side of chart
 - At the top, locate the relative humidity
 - Follow across and down to locate the Heat Index temperature
 - Heat stress risk can be the Heat Index coding



WHAT CAUSES HEAT ILLNESS?

- Heat illness, results from a combination of:
 - High environmental temperature and humidity
 - Heavy physical activity
 - Body core cooling failure



WHEN BODY CORE COOLING FAILS...

- Profuse sweating leads to dehydration, no sweat is left to cool the body, and body core rises
- Excess salt loss from sweating causes heat cramps, nausea and fatigue
- So much blood flows to skin from the body core that internal organs cannot function properly, resulting in fainting and other more serious forms of heat illness
- This elevated body temperature due to failed thermoregulation is called “hyperthermia”



INCREASED RISK FACTORS



- The following personal conditions may predispose individuals to heat related illness:

Heart disease, high blood pressure

Diabetes

Liver, kidney, and lung problems

Pregnancy

Being overweight

Having very small body size

Increasing age over 40

Recent immunization

Low salt diet

Use of RX and OTC medications

Recent injury or illness

Fever, infection, cold or flu

Diarrhea, vomiting

General fatigue, lack of sleep

Poor nutrition, dehydration

Alcohol and caffeine consumption

Use of illicit drugs

Sunburn, heat rash

Previous heat illness

Lack of acclimatization

INCREASED RISK FACTORS

- The following weather related conditions may predispose individuals to heat related illness:
 - Temperatures consistently above 70°F during the day
 - Temperatures consistently above 80°F at night
 - Direct sunlight (can equal an increase of 13°F in the air)
 - High humidity
 - Little air movement



INCREASED RISK FACTORS

- The following work-related conditions may predispose individuals to heat related illness:
 - Heavy, manual, physically demanding work activities
 - Prolonged shifts
 - Few or very short rest breaks
 - Heavy clothing
 - Personal protective equipment
 - Working with heat-generating equipment
 - Exposure to hazardous or toxic substances



EFFECTS OF HEAT STRESS

- Illnesses can result from uncontrolled exposure to heat stress include:
 - **heat fatigue**
 - **heat edema**
 - **heat rashes**
 - **heat collapse**
 - **heat cramps**
 - **heat exhaustion**
 - **heat stroke**



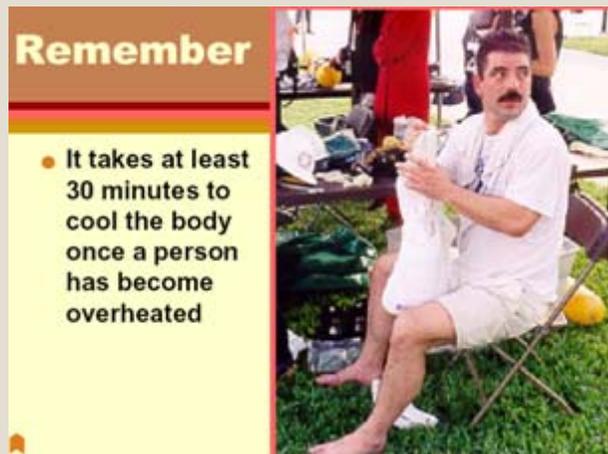
HEAT FATIGUE



- The signs and symptoms of heat fatigue include a general feeling of physical weariness and impaired performance of skilled motor, mental or vigilance jobs.
- Treatment for heat fatigue:
 - Remove the heat stressor (or the worker from the heat exposure) before a more serious heat-related condition develops.
- One factor that almost always predisposes an individual to heat fatigue is a lack of acclimatization.
 - The human body can adapt to heat exposure to some extent over time - this physiological adaptation is called “acclimatization”.

HEAT FATIGUE

- Acclimatization is accomplished by gradually increasing work activities over a 1-2 week period.
 - During this time the same activities will produce fewer cardiovascular demands.
 - The worker will sweat more efficiently and will more easily be able to maintain normal core body temperatures.



HEAT EDEMA

- A minor heat illness that many people experience is heat “edema” or swelling of the extremities, especially arms, hands, fingers and feet.
 - Heat causes blood vessels to dilate (expand) and blood moves into the extremities causing swelling which may become uncomfortable to painful.
 - This swelling may be increased by prolonged sitting or standing in place in a hot environment, consuming too much salt, not losing enough salt, medications or health conditions affecting circulation.



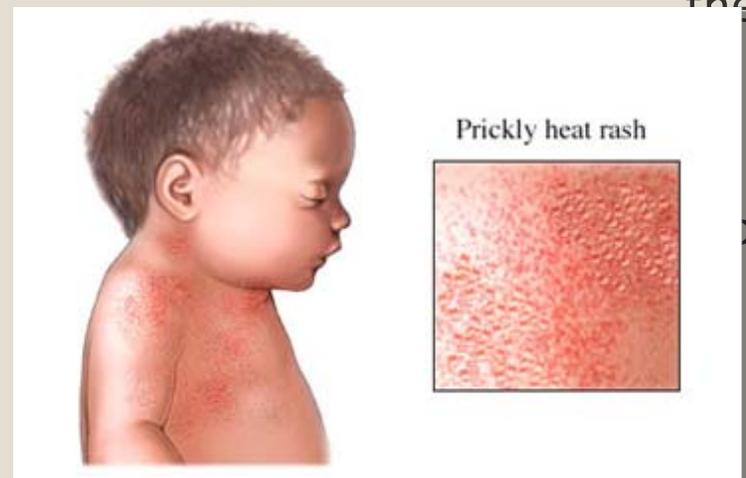
HEAT EDEMA



- Edema may be relieved by:
 - Leaving the hot environment.
 - Moving around or changing position as often as possible.
 - Cooling off the body with moving air, placing extremities in cool water, or placing ice bags where large blood vessels lie close to the skin surface (under arms and in groin area).
 - Removing restrictive clothing and jewelry.
 - Lifting extremities above heart level.
 - Monitoring salt intake and increasing hydration.

HEAT RASHES

- One of the most common problems from working in hot environments over time is heat rash.
 - Prickly heat, a type of heat rash, is manifested as small red solid bumps, or papules, that usually appear in areas where the clothing is restrictive and traps moisture.
 - As sweating increases, papules give rise “prickling” sensation.
 - Heat rash papules may be infected if they are left untreated.



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HEAT RASHES

- Prickly heat rash occurs in skin that is persistently wetted by unevaporated sweat.
- Prevention includes:
 - Washing and drying affected skin.
 - Wearing loose fitting clothing made with and breathable fibers such as cotton.
 - Increasing air movement and cooling.
- In most cases, heat rashes will disappear when the affected individual returns to a cool environment and dries off.



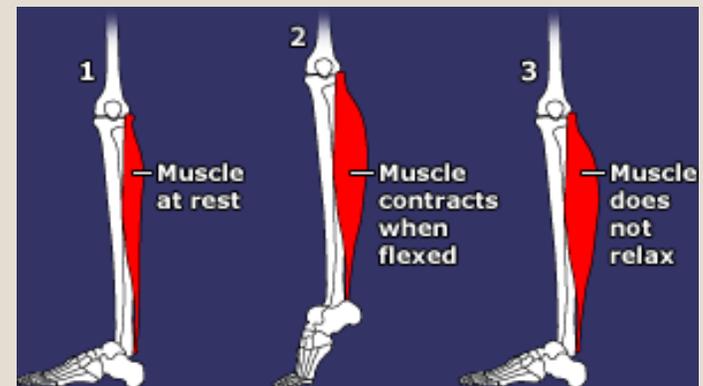
HEAT COLLAPSE



- In heat collapse or “fainting”, the brain does not receive enough oxygen from blood vessels dilating and blood pooling in the extremities, especially the legs.
 - As a result, the exposed individual may lose consciousness.
 - This reaction does not affect the body's heat balance, but the onset of heat collapse is rapid and unpredictable.
 - To treat heat collapse, have the worker stop working and take a rest break in a cooler environment.
- Having workers become gradually acclimatized to hot work environments is the best method of prevention.

HEAT CRAMPS

- Heat cramps are often caused by performing hard physical labor in a hot environment and attributed to an electrolyte imbalance caused by sweating.
 - The muscles used the most are usually effected the most.
 - Cramps can be caused by both too much and too little salt, as well as a lack of hydration (water replenishment).
- To relieve heat cramps:
 - Stop work immediately,
 - Go to a cooler place, and
 - Rest and re-hydrate.
- Recovery takes about one hour.



HEAT CRAMPS



- Managing fluid replacement (hydration):
 - Cool (50°-60°F) water or any cool liquid (except alcoholic, high-sugar and caffeine-containing drinks) should be readily available to workers.
 - volunteers should drink small amounts frequently, about one cup every 15-20 minutes in excessive hot environments.
- Although many commercial replacement drinks contain salt, this is not necessary for acclimatized individuals since most people already add enough salt to their diets.

HEAT EXHAUSTION

- The signs and symptoms of heat exhaustion are usually some combination of:
 - Red or pale cool skin,
 - Profuse sweating,
 - Extreme thirst,
 - Headache,
 - Nausea and vomiting,
 - Strong muscle cramps,
 - Weakness and exhaustion,
 - Mood changes such as irritability or giddiness,
 - Lightheadedness, vertigo, or fainting.



HEAT EXHAUSTION

- Fortunately, this condition responds readily to prompt treatment:
 - having the volunteer immediately removed from the hot environment,
 - cooling down with circulating air applying cool (not cold) skin, and/or
 - re-hydrate by slowly drinking (or ice) water or drinks, and
 - resting in the sitting position or down.



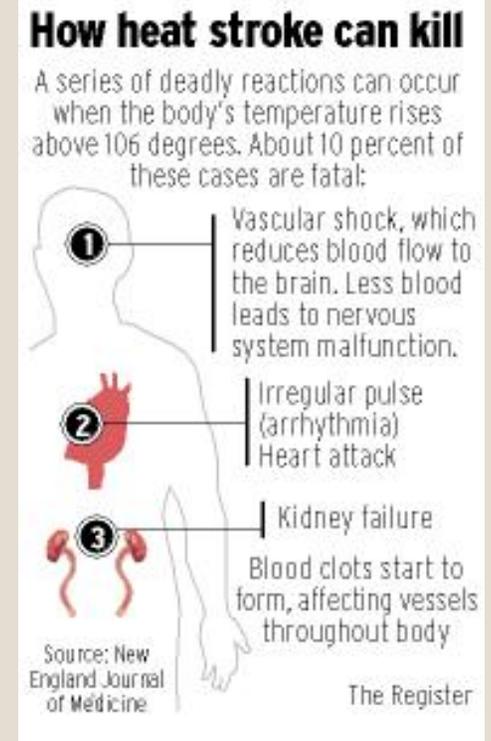
HEAT EXHAUSTION

- Heat exhaustion should never be ignored since vertigo and fainting can result in the volunteer becoming injured while operating machinery or falling down.
- The physical signs and symptoms seen in heat exhaustion are similar to and an early warning of potential **HEAT STROKE**, a medical emergency.



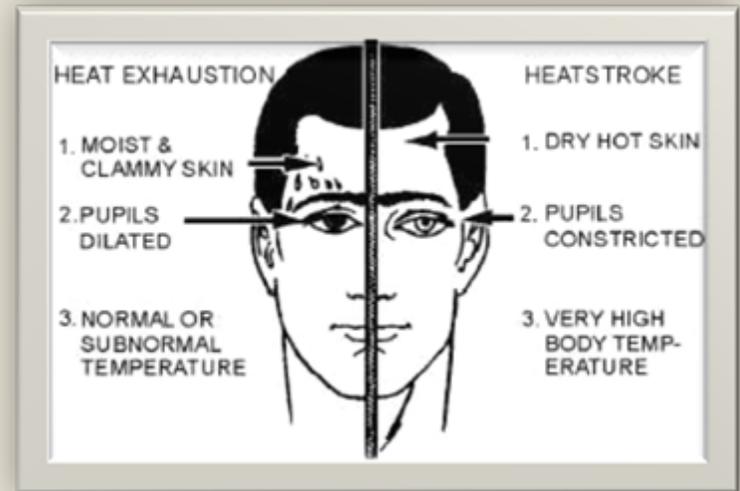
HEAT STROKE

- Heat Stroke occurs when the body's ability to regulate internal temperature fails and core body temperature rises uncontrolled to critical levels, a condition also known as “hyperthermia”.
- *Heat stroke is a life threatening condition.*
- If body temperature is too high for too long, the brain and heart will stop functioning resulting in death.



HEAT STROKE

- Primary signs and symptoms of heat stroke are:
 - argumentative and irrational behavior,
 - confusion or delirium,
 - loss of consciousness,
 - convulsions,
 - rapid pulse,
 - difficulty breathing,
 - a lack of sweating (usually),
 - hot dry skin that may be bright red, mottled or bluish,
 - abnormally high body temperatures, over 104°F (40°C)



HEAT STROKE



- The elevated metabolic temperatures caused by a combination of excessive work load and environmental heat load, both of which contribute to heat stroke, are highly variable and difficult to predict.
- If a worker shows signs of possible heat stroke, professional medical treatment must be obtained immediately.
- **CALL 9-1-1 or other local emergency response.**

HEAT STROKE

- Emergency first aid administration (until professional help arrives) includes:
 - Immediately taking the worker to a cooler and shady area.
 - Removing any heavy outer clothing to help increase heat loss.
 - Wetting the worker's skin and clothes, but do not apply ice or very cold water.
 - Increasing air movement to improve evaporative cooling.



HEAT STROKE

- If the worker is conscious, have him/her rest until emergency services arrives.
 - Do not give any drinks since they will not stay down.
- If unconscious, the worker should be placed in the recovery position to ensure his/her airway remains open.



HEAT ILLNESS OUTCOMES

- The medical outcome of an episode of heat stroke, heat exhaustion or any other heat illness depends on the timing and effectiveness of first aid treatment.
- OSHA standards require ready availability of:
 - Medical personnel for advice and consultation.
 - Person(s) adequately trained to render first aid and CPR.
 - Adequate first aid supplies.
 - Potable drinking water.



PREVENTING HEAT RELATED HEALTH PROBLEMS

- The human body is about 2/3 water, of which 5-6 quarts is blood.
- Problem: an adult loses about 10 cups of water everyday to sweat, breathing and urination.
 - This increases to about a quart an hour in hot environments with strenuous physical activity.
- Solution: make sure to maintain bodily fluids by staying hydrated.



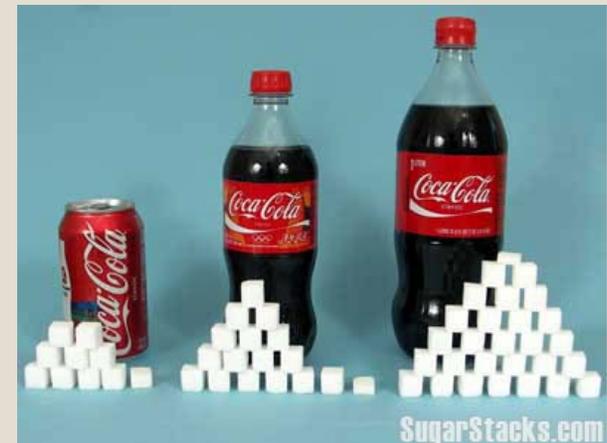
MANAGING HYDRATION

- Begin hydrating before starting work and intake must be continuous during the course of physical activities.
- It is recommended that adults drink one cup of water every 15-20 minutes in hot environments.
- Do not rely on thirst as an indicator of hydration.
- Avoid “heat hangover” (headaches and fatigue) by continuing to drink fluids after exposure to hot environments and strenuous activity.



MANAGING HYDRATION

- Avoid alcoholic, high-sugar-content and caffeinated beverages since they act as a diuretic (a substance which causes an increase in the production of urine) which decreases hydration.
- How much sugar is in soda?
 - 1 cube sugar = 4 grams
 - 1 cube = 1 packet = 1 teaspoon
 - 12 oz soda = 40-45 grams



PREVENTING HEAT RELATED HEALTH PROBLEMS

- Pace your work activities during times of high temperatures.
 - If working outdoors, take frequent rest periods in the shade.
- Avoid large meals and heavy foods they increase metabolic heat increase water loss.
 - Instead eat smaller and lighter meals more often.
- Be aware of prescribed and over-the-counter medications that may adversely affect hydration or create sensitivity to hot environments.



MANAGING MEDICATIONS

- Some medicines may increase heat illness risk as they may affect the way your body reacts to heat, such as:
 - Allergy medicines (antihistamines) and decongestants
 - Weight loss diet pills and illegal drugs (e.g. amphetamines)
 - Some medicines that treat mental health conditions (antidepressants and antipsychotics)
 - Seizure medicines (anticonvulsants)
 - Laxatives
 - Water pills (diuretics)
 - Some blood pressure and heart medicines



PREVENTING HEAT RELATED HEALTH PROBLEMS

- Dress cool by wearing lightweight loose fitting clothing which allows air to move around your body.
- If outdoors, wear light colors to reflect heat and wide brim hats for shade.
- Avoid clothing made of synthetic fibers such as polyester and nylon which tend to trap moisture and retain body heat.
- Utilize personal shading and cooling devices such as cooling vests, neck or head wraps, and similar items.



PERSONAL PROTECTIVE EQUIPMENT

- Personal Protective Equipment (PPE) required to be worn by workers may and often does increase the likelihood and severity of heat illness.
- Types of PPE that enhance heat exposures may include:
 - Respirators and Supplies Air Systems
 - Heat and Flash/Fire Resistant (FR) clothing
 - Clean-room and HAZMAT suits
 - Fire Fighter Turnouts



PREVENTING HEAT STRESS



- Engineering Controls recommended to reduce heat:
 - Control the heat at the source through the use of insulating devices and reflective barriers.
 - Exhaust hot air and steam produced by specific operations.
 - Increase air movement via fans and blowers.
 - Reduce the temperature and humidity through air cooling and provide air-conditioned rest areas whenever possible.
 - Provide shade structures for rest areas and whenever possible for work areas.
 - Reduce physical demands of work task through mechanical assistance (hoists, lift-tables, etc.).

PREVENTING HEAT STRESS



- Administrative and Work Practice Controls recommended to reduce heat illness:
 - Schedule heavy work during the coolest parts of the day (e.g., early morning and night shifts).
 - Require workers take intermittent rest periods with water breaks.
 - Assign extra workers and rotate workers assigned to hot work areas or heavy work.
 - Schedule routine maintenance and repair work in hot areas during the cooler seasons of the year.
 - Limit worker occupancy or the number of workers present, especially in confined or enclosed spaces.

KNOWLEDGE REVIEW

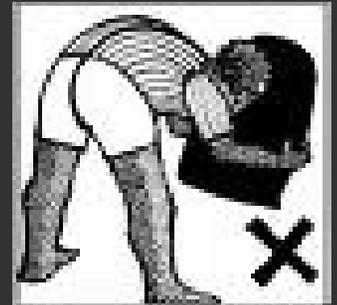
- What are 3 personal reasons for increased risk to develop heat related illness?
- What are 3 work-related causes of heat illness?
- What are 3 ways to prepare volunteers for work in hot environments.
- What are 3 symptoms often seen in:
 - beginning stages of heat illness
 - heat exhaustion victims
 - heat stroke victims



ANY QUESTIONS?



BACK SAFETY AWARENESS



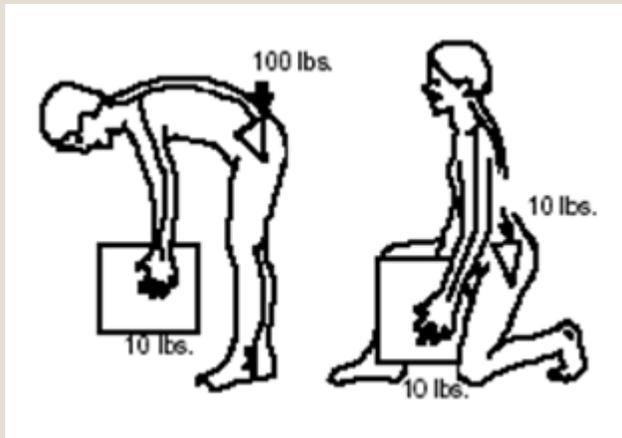
BACK SAFETY

- Back injuries tend to be the result of **cumulative exposure** occurring over time, rather than being caused by a single incident.
- A person can be at risk while working as well as at home and during leisure activities.



BACK SAFETY

- The major factors leading to back injury are:
 - Position – improper lifting
 - Force – lifting too much weight
 - Repetition – too many lifts



FIVE ACTIVITIES THAT COULD INJURE THE BACK

■ Lifting/Lowering:

- Lifting is to raise from a lower to a higher level.
- Lowering is the opposite activity from lifting.
- The range of a lift can be from the ground to as high as you can reach your hands.



FIVE ACTIVITIES THAT COULD INJURE THE BACK

■ Pushing/Pulling:

- Pushing is to press against with force in order to move the object.
- The opposite is to pull.
- Pulling requires more force pushing – why?



FIVE ACTIVITIES THAT COULD INJURE THE BACK

■ Twisting:

- As applied to lifting, it is the act of moving the upper body to one side or the other while the lower body remains in a relatively fixed position.
- Twisting can take place while the entire body is in a state of motion.



FIVE ACTIVITIES THAT COULD INJURE THE BACK



■ Carrying:

- Having an object in ones grasp or attached while in the act of moving.
- The weight of the object becomes a part of the total weight of the person doing the work.

FIVE ACTIVITIES THAT COULD INJURE THE BACK

- Holding:
 - Having an object in one's grasp while in a static body position.



POSSIBLE SIGNS OF INJURY

■ Listen to your body!

- Pay attention to those first aches and pains! Do not "turn your back" on the following symptoms:
 - Aching or "minor pulls"
 - Sharp or dull pain
 - Pain that comes and goes
 - Hot, inflamed feeling
 - Tingling or numbness
 - Unusual stiffness or tightness
 - Unusual muscle weakness and fatigue.



■ Report any problems to your supervisor immediately!

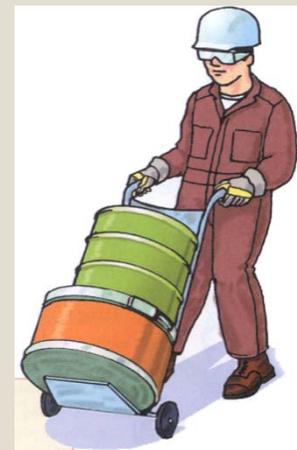
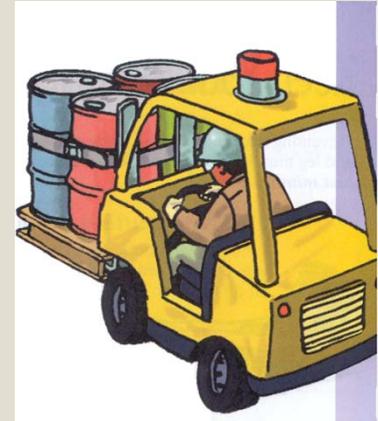
BACK SAFETY

- Ways to prevent back injuries include:
 - Provide engineering controls when possible to remove lifting hazards.
 - Ex: using dollies or carts, lowering truck lift-gate, standing on ladder
 - Train volunteers in proper lifting technique and other work practice controls to reduce lifting hazards.
 - Ex: use team lifting, warm-up stretching.



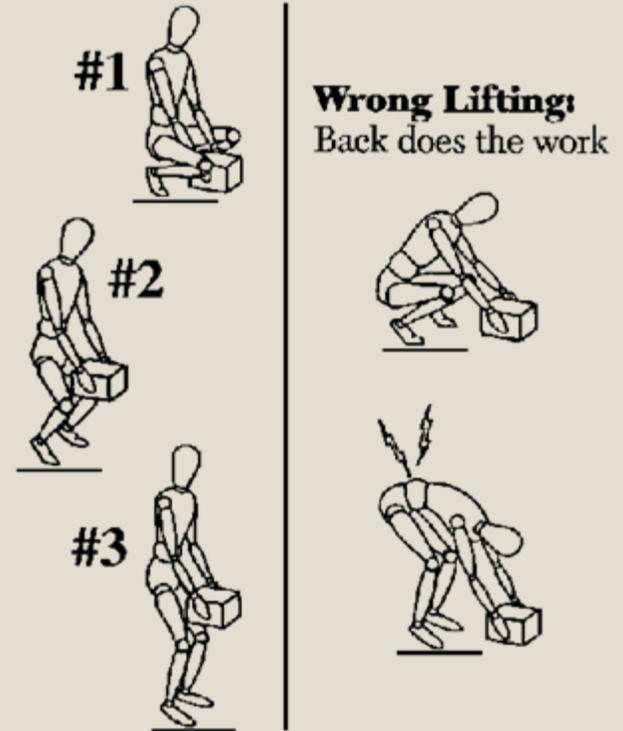
BACK SAFETY ENGINEERING CONTROLS

- Examples include:
 - Reducing the size or weight of the object lifted.
 - Provide handles for boxes/packages being lifted.
 - Provide material handling equipment such as dollies, carts or forklifts.
 - Adjust the height of a pallet or shelf, to eliminate the need for lifting below knee height or above shoulder height.
 - Instead of reaching overhead, elevate volunteer to level of item on the shelf.



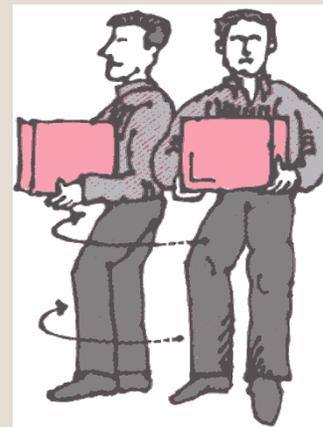
SAFE LIFTING

- Proper lifting from the floor is as follows:
 - Make sure item is not too heavy.
 - Place feet correctly.
 - Bend knees instead of bending over at middle of the back.
 - Maintain natural curvature of the spine.
 - Use correct grasp.
 - Keep load close to body - utilize leverage.
 - Always keep the back as straight as possible while lifting - avoid arching the back.



CORRECT CARRYING

- Do not carry a load that obstructs your view in your direction of travel.
- Make sure that the path of travel is clear of obstructions.
- Do not turn at the waist to change direction or to put an object down; turn the whole body and crouch down to lower the object.



REPETITIVE LIFTING CAPACITY

- National Safety Council (NSC) Lifting Recommendation - maximum repetitive lifting capacity:
 - Females = 40 lbs
 - Males = 60 lbs



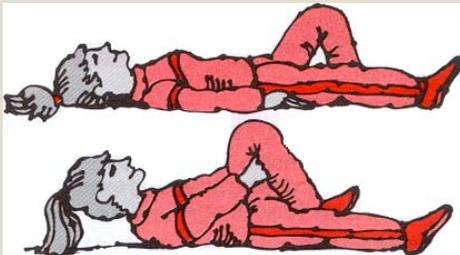
LIFTING METHODS – TEAM LIFTING

- Where the load or material is too much for one person to handle safely, and mechanical equipment is not practical, assign additional worker(s) to assist in the job.
- Workers of about the same size should be used and they should be trained in team-lifting.
 - Pick a leader - if one worker lifts too soon, shifts the load, or lowers improperly, the partner may be overloaded and strained.



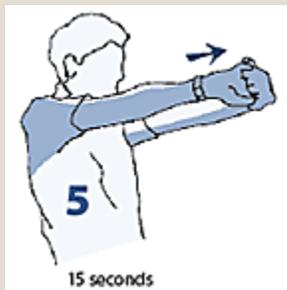
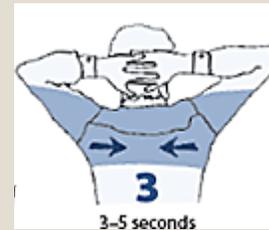
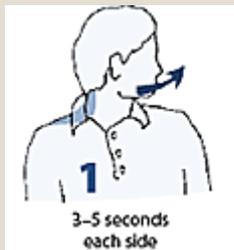
STRETCHING

- Workers that implement warm-up and stretching programs experience as much as 75% fewer back strain, joint and other soft-tissue injuries.
- To be effective:
 - Warm up and stretch your muscles before starting work everyday.
 - Step away from the job regularly to stretch and do something else for a few moments, so that your muscles can relax, rest and receive oxygen.



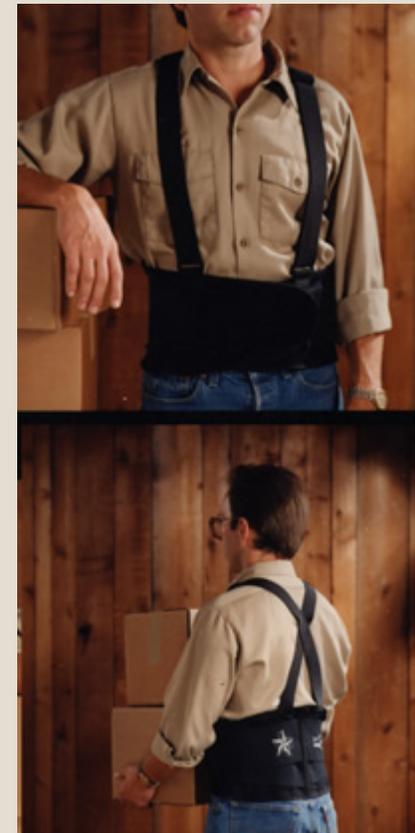
STRETCH EXERCISES

- Lets practice together!



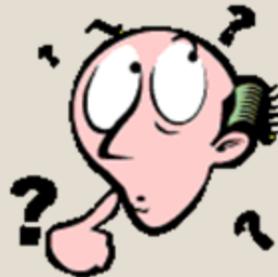
BACK BELTS – PPE?

- Employers relying on back belts to prevent injury should be aware of the lack of scientific evidence supporting their use.
- If workers falsely believe they are protected, they may subject themselves to even greater risk by lifting more weight than they would have without a belt.



KNOWLEDGE REVIEW

- List three major factors causing back injuries.
- List three activities that cause back injuries.
- List two engineering controls to prevent back injuries.
- Describe the correct way to carry lifted items.
- Explain why stretching can help prevent back injuries.
- Explain why a back belt can contribute to back injuries.



ANY QUESTIONS?

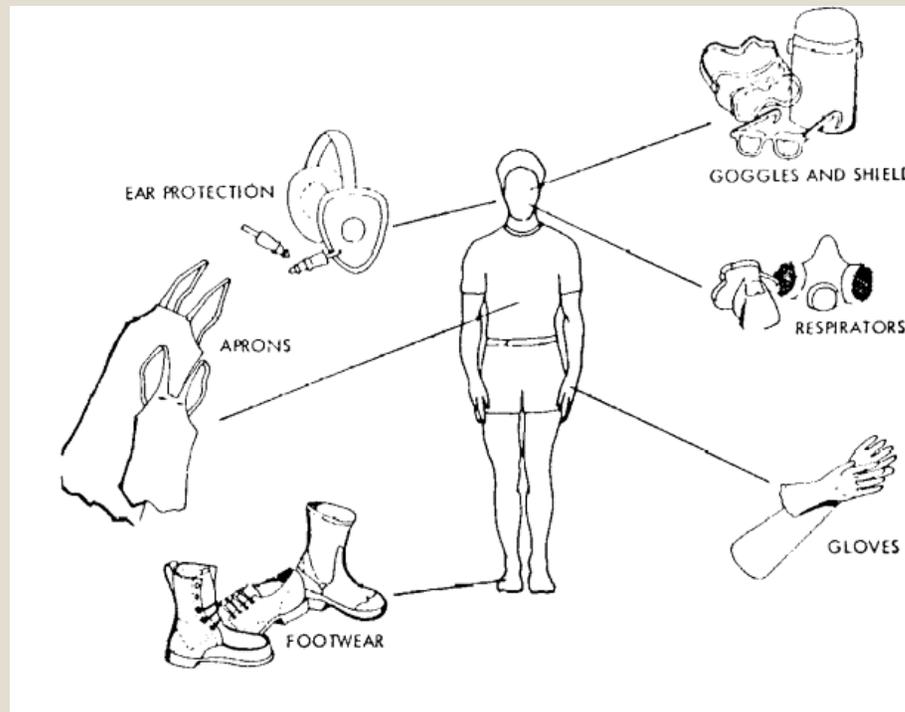


PERSONAL PROTECTIVE EQUIPMENT



PERSONAL PROTECTIVE EQUIPMENT

- Personal Protective Equipment (PPE) includes all clothing and other work accessories designed to create a personal barrier against workplace hazards.
- Examples include:



PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Appropriate PPE chosen and provided must be worn to protect against bodily hazards when handling hazardous materials.
 - The specific types of PPE required will vary depending upon the hazards encountered and duties assigned at the collection site.
 - PPE that is required includes: glasses or goggles, safety chemical resistant aprons, and closed-toe shoes.



PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Volunteers will be provided PPE at no cost and instructed in PPE proper fit, maintenance, sanitation, use, limitations, and disposal.



EYE/FACE PPE

- Eye and face protection is required to protect against hazards such as dust, flying particles, chemicals, intense light, and any other hazard.
 - Protective eyewear chosen must be worn to protect against the specific hazards encountered by the volunteers.



SAFETY GLASSES



- Used to protect against moderate impact from particles and flying objects.
 - Made with metal or plastic safety frames, may be sunshades or clear, most come with side shields, and some available with magnifiers.
 - Not good for protection against fine dust, liquid splashes and vapors.
- Approved glasses will have Z87.1 symbol.



WHAT'S THE HAZARD?



PRESCRIPTION SAFETY GLASSES

- Eyeglasses designed for ordinary wear do not provide the required protection against workplace hazards.

- Proper choices include:

- Prescription safety glasses with side shields meeting ANSI Z87.1.
- Glasses/goggles that can fit over corrective eyeglasses without disturbing their alignment
- Goggles that incorporate corrective lenses.



SAFETY GOGGLES

- Used to protect eyes, eye sockets, and the facial area immediately surrounding the eyes from impact, dust, vapors and liquid splashes.
 - Some goggles fit over corrective lenses.
 - Anti-fogging cleaners and coatings are available to keep lenses from becoming obscured.
 - Lenses are available clear or shaded.
 - Approved goggles will have Z87.1 symbol.



FACE SHIELDS

- Used to protect faces from nuisance dusts and potential splashes or sprays of non-hazardous liquids.
 - Most shields do not protect volunteers from impact hazards.
- For protection against hazardous chemicals, blood and other infectious liquids, a combination of safety glasses or goggles supplemented by a face shield, are recommended.



HAND PROTECTION

- Hand and arm protection must be used to protect against hazards such as sharp objects and chemical hazards.
 - Gloves chosen must be worn to protect against the specific hazards encountered by the volunteers.



CHEMICAL RESISTANT GLOVES

- Various materials designed to protect hands from chemical exposure.
 - Rubber varieties include: butyl, neoprene, nitrile, viton, natural rubber and latex.



WHAT'S THE HAZARD?



ABRASION RESISTANT GLOVES

- Designed to protect hands from direct contact with sharp edges such as glass, metal and other materials.
 - Leather and string knit are for general use and do not really protect against repeated sharp cuts or punctures.



BODY PROTECTIVE CLOTHING

- Full body protection must be used to protect against hazards such as being struck-by vehicles and everyday clothing being contaminated by hazardous chemicals.
 - Clothing chosen must be worn to protect against the specific hazards encountered by the volunteers.



HIGH VISIBILITY PPE

- Volunteers engaged in traffic control or who are exposed to vehicular traffic must wear high-visibility vests or garments.



CHEMICAL RESISTANT CLOTHING

- To keep hazardous materials from being splashed onto or seeping into volunteer clothing, chemical protective aprons must be worn.
- Lab coats and full body suits are also available on request.



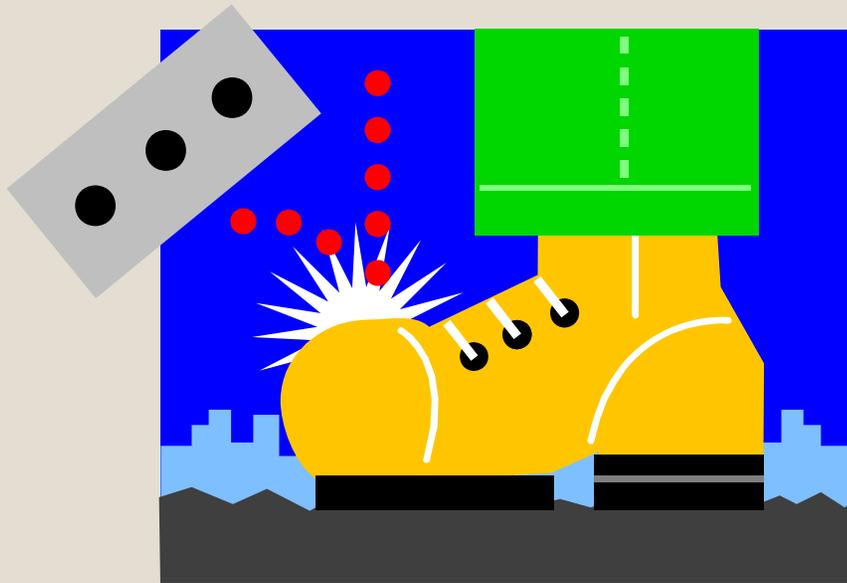
PROPER FOOTWEAR

- Volunteers are required to wear closed toe shoes to protect against hazards such as dropped items, stubbed toes, insects, and being contaminated by hazardous chemicals.
 - Comfortable work shoes or boots are highly recommended.



SAFETY SHOES

- Steel-toes are required to protect the feet when move drums and operate dollies or pallet jacks.



HEAD PROTECTION

- Volunteers are encouraged to wear hats to prevent sunburn and provide personal shade to help keep cool.
 - Such hats should be light colored, breathable, and wide brimmed.



WHEN TO REMOVE PPE



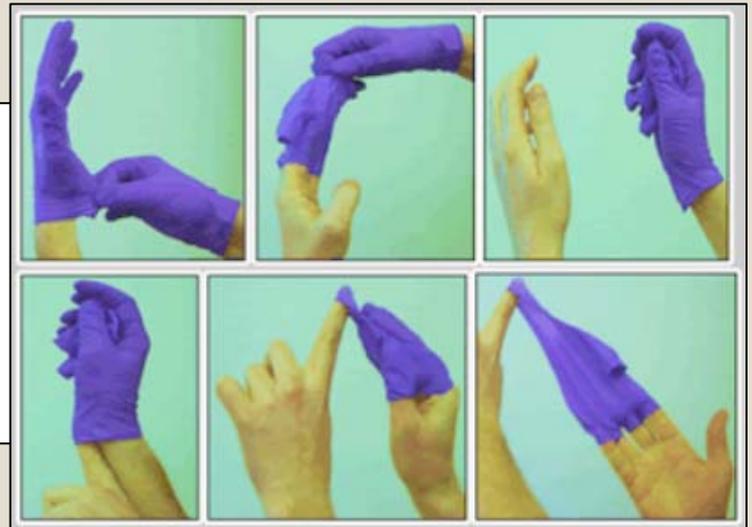
- Replace your PPE during the collection event if it becomes damaged or contaminated.
 - Safety glasses may be cleaned if not too contaminated.
- Remove your gloves when eating or drinking in the break area.
 - You may leave your vest and apron on, as long as they are not contaminated.
- Remove your gloves, vest and apron when leaving the site.
 - This includes leaving to use the restroom.

REMOVING CONTAMINATED GLOVES

- Frequently replace your gloves, because of the chemical residues that often remain on containers.
- Here's how to remove contaminated gloves:

GLOVES

Outside of gloves is contaminated!
Grasp outside of glove with opposite gloved hand; peel off
Hold removed glove in gloved hand
Slide fingers of ungloved hand under remaining glove at wrist
Peel glove off over first glovet
Discard gloves in waste container



WHERE TO DISPOSE PPE

- Sort the contaminated PPE (disposable items separate from reusable), bag and label it.
 - Reusable items include safety glasses, goggles, and heavy gloves.



KNOWLEDGE REVIEW

- List all PPE required to worn by volunteers.
- Describe two types of protective eyewear.
- Describe two types of protective gloves.
- Describe two types of body PPE.
- Describe improper footwear.
- Explain when must PPE be removed.
- Explain how to remove contaminated PPE.



ANY QUESTIONS?



COLLECTION EVENTS





COLLECTION EVENT PURPOSE

- Removing hazardous materials from circulation through frequent collection periods where wastes are then:
 - Recycled - examples: used oil, antifreeze, and paint
 - Reclaimed – examples: lead batteries, fluorescent lamps, and broken thermometers can be processed to reclaim metals within
 - Neutralized – examples: simple acids and bases may be neutralized by combining them to form salt solutions
 - Disposed – examples: old pesticides, paint strippers, and wood preservatives may be reused or safely be destroyed
- Educating the community about the potential impacts of household hazardous materials.

WHERE & WHEN ARE COLLECTION EVENTS HELD?

- HHW Main Facility, 2440 W. Sweetwater Drive
 - Open Friday & Saturday, 8 AM to 12 noon
- “Eastside” Outreach, 7575 E. Speedway Boulevard
 - Open first Saturday of every month from 8 a.m. to 12 p.m
- Tucson Water Plant 2 Outreach, 1102 W. Irvington Road
 - Open second Saturday of every month from 8 a.m. to 12 p.m
- Remote outreaches are held during the year in rural Pima County locations and at many City of Tucson neighborhoods.

WHAT IS HOUSEHOLD HAZARDOUS WASTE?

- The Tucson/Pima County Household Hazardous Waste Program defines HHW as follows:
 - It must be from a household.
 - It may be in the form of a liquid, emulsion, paste, powder, crystal or compressed gas (such as an aerosol or propane cylinder) or other form.
 - It may be an oxidizer, flammable, poisonous, irritating, acidic, basic material or a combination of these.
 - It may consumer gas cylinders (e.g. barbq LPG)
 - It may be other wastes such as fluorescent lamps, batteries, used oil, used computers

WHAT IS HOUSEHOLD HAZARDOUS WASTE?

- Household Hazardous Wastes is NOT:
 - from any commercial or business operation.
 - commercial gas cylinders.
 - radioactive, infectious, explosive, pyrophoric, shock sensitive, unstable or otherwise unpredictable.
 - unused medications.
 - biohazardous (anything that comes in contact with your body, i.e. used hypodermic needles, bandages).

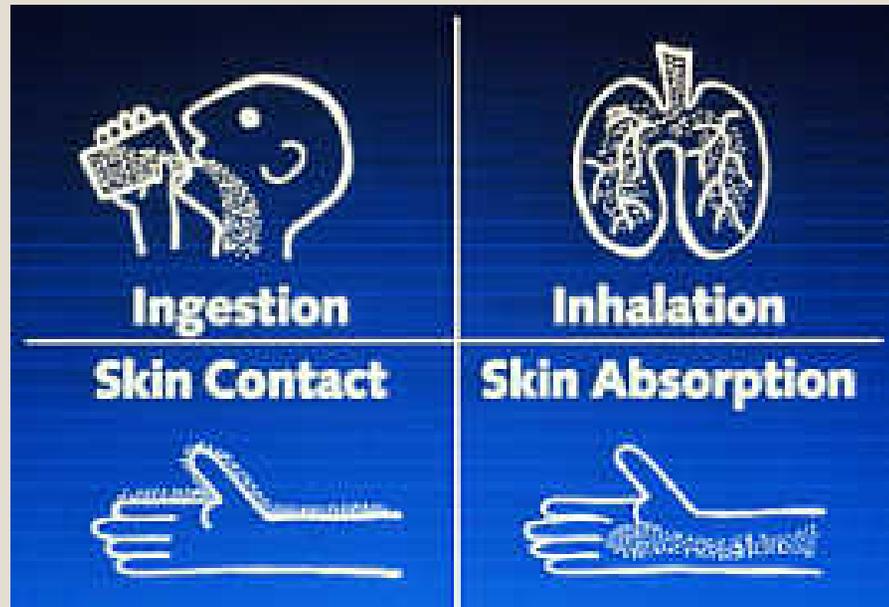
MATERIAL HANDLING SAFETY

- The highest risk of chemical exposure occurs when you are removing items from a participant's trunk.
 - You do not know what is inside, you do not know the condition of the containers, and you do not know what happened during transport.
 - Often the participant may not know exactly what the material is, and participants often mislabel or repackage items.
- Because of this uncertainty, you must treat all material as potentially hazardous, even those that appear to be nontoxic such as dish soap.



POTENTIAL EXPOSURES

- There are four main ways hazardous wastes can enter your body.
 - ingestion
 - inhalation
 - direct contact
 - injection
 - absorption



ROUTES OF EXPOSURE

- **Swallowing or eating (ingestion):**
 - Many adults eat chemicals accidentally by touching food products without first washing their hands.
 - Example: Eating a donut without removing your gloves after pouring oil.



ROUTES OF EXPOSURE

■ Breathing into the lungs (inhalation):

- Breathing is the most common way of bringing chemicals into the body because we cannot see or smell many of the chemicals that are most harmful to us.
- Example: Spraying pesticides without using appropriate respiratory protection.



ROUTES OF EXPOSURE

- **Touching or direct contact with the skin (absorption):**
 - Some chemicals seep into the skin quickly while others enter through open wounds.
 - Example: Having a chemical drip from a leaking container onto your skin.



ROUTES OF EXPOSURE

■ Puncture of the skin (injection):

- Needle pricks from syringes are commonly thought of when talking about punctures, however, pieces of glass or metal objects can also poke through skin.
- Example: Cutting your finger on a piece of glass from a broken mercury thermometer.



SYMPTOMS OF EXPOSURE

- Symptoms of hazardous materials over-exposures may include any of the following:
 - Confusion, Anxiety, Dizziness, Blurred Vision, Skin Color Change, Burns, Cough, Chest Pain, Numbness of Extremities, Nausea, Vomiting, Abdominal Cramps, etc...



PREVENTING EXPOSURES



- Wear all required PPE when at a collection event.
 - You may be asked to leave if you do not wear the appropriate PPE.
 - Replace your PPE during the collection event if it because damaged or contaminated.
 - Frequently replace your gloves, because of the chemical residues that often remain on containers.
 - Remove your gloves, vest and apron when leaving the site (including leaving to use the restroom).
 - Remove your gloves when eating or drinking in the break area. You may leave your vest and apron on, if not contaminated.

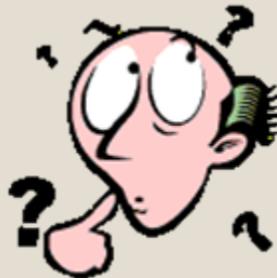
PREVENTING EXPOSURES



- The following steps help prevent chemical exposure:
 - Smoking is prohibited within 50 feet of a collection event.
 - Chewing tobacco or gum, biting fingernails, eating or drinking are strictly forbidden while collecting, packaging, labeling, transferring, or otherwise handling any HHW.
 - Read the labeling on HHW to determine material hazard types.
 - Broken or cracked containers can be placed in a plastic bag and taped shut.
 - Do not rush your activities even when there is a long line of cars.
 - Stay calm and focused.

KNOWLEDGE REVIEW

- Describe the purpose of collection events.
- Give four examples of what HHW is.
- Explain what is not considered HHW.
- List the four routes of exposure.
- List five ways exposures can be prevented.



QUESTIONS



SETTING UP A COLLECTION EVENT

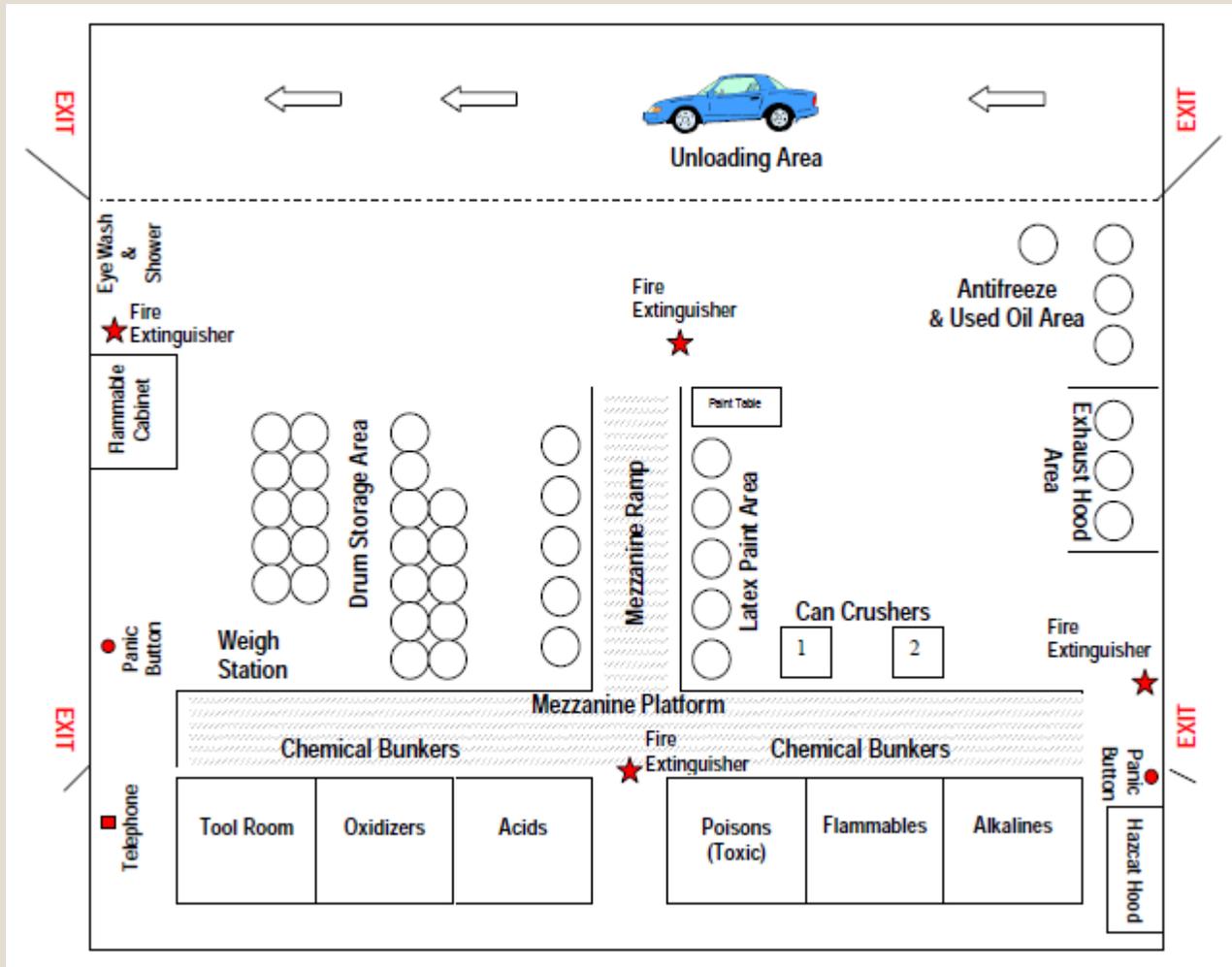
- The HHW Program staff or Volunteer Coordinator will schedule volunteers for each particular collection day.
 - Your participation will be confirmed with an e-mail or phone.
- We ask that you be at the site a one-half hour before the site opens (e.g. 7:30 am for sites open at 8 am).
 - This will give you enough time to participate in the Site Safety and Health Meeting, determine task assignments, sign-in and receive personal protective equipment, set up our tables, cones, traffic routes and collection and packaging area.

SITE SAFETY MEETING

- A site safety meeting will be held before the actual collection event to discuss the following:
 - Each person's role in the collection event;
 - Location of safety equipment;
 - Contingency plans;
 - Waste packing guidelines & unacceptable materials;
 - Chemical/Physical hazards associated with the wastes and collection activities;
 - Personal protective equipment requirements; and
 - Safety precautions/work practices.



SWEETWATER "MAIN" COLLECTION SITE



“MAIN” COLLECTION SITE

- Entrance to the collection facility.



“MAIN” COLLECTION SITE

- Car stopped at entrance to the collection building.



“MAIN” COLLECTION SITE

- Inside the collection building.



“MAIN” COLLECTION SITE

- Car stopped inside the collection building.



“MAIN” COLLECTION SITE

- HHW removed from car stopped inside the collection building.



“MAIN” COLLECTION SITE

- HHW sorting areas inside the collection building.



“MAIN” COLLECTION SITE

- HHW sorting areas inside the collection building.



“MAIN” COLLECTION SITE

- HHW sorting areas inside the collection building.



“MAIN” COLLECTION SITE

- HHW sorting areas inside the collection building.



“MAIN” COLLECTION SITE

- HHW sorting areas inside the collection building.



“MAIN” COLLECTION SITE

- HHW sorting areas inside the collection building.



“MAIN” COLLECTION SITE

- HHW sorting areas inside the collection building.



“MAIN” COLLECTION SITE

- Emergency first aid station inside the collection building.

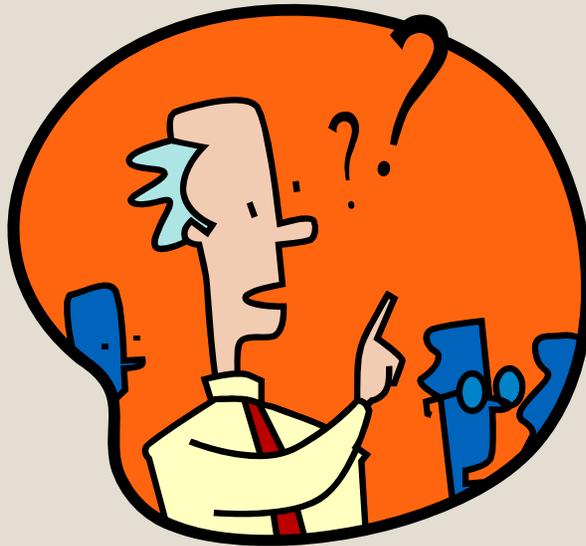


“MAIN” COLLECTION SITE

- Drop & Swap area outside exiting the collection facility building.



QUESTIONS



REMOTE COLLECTION EVENT

- Entrance to the collection facility.



REMOTE COLLECTION EVENT

- Entrance and driveway to the collection facility.



REMOTE COLLECTION EVENT

- Survey taken by greeter at the entrance to the collection facility.



REMOTE COLLECTION EVENT

- Driveway to the collection facility.



E. SPEEDWAY COLLECTION EVENT

- Collection facility tent.



HHW HANDLING PROCEDURE

- Upon approaching the vehicle, ask the participant to:
 - Place vehicle in park.
 - Turn off the engine.
 - Keep children and pets controlled inside the car.
 - Request that driver open the vehicle and point out donated items.



HHW HANDLING PROCEDURE

- Before removing items from a car, ask the participant what they have brought to the collection event.



HHW HANDLING PROCEDURE

- Observe the waste, look at the condition of the containers, look for signs of spillage and look for prohibited waste.





HHW HANDLING PROCEDURE

- Observe the labeling, or lack thereof, on the waste containers.
 - If the waste is in its original container and the labeling adequately names the waste without using obscure trade names or symbols, accept it as is.
 - If the waste is in its original package and has additional information written on it, such as the shelf date or any of the words "waste," "used," "old" or "bad," accept it as is.
 - If the waste is in a package other than its original package, but has sufficient additional information to indicate what it is, accept it as is.



HHW HANDLING PROCEDURE

- Observe the labeling, or lack thereof, on the waste containers.
 - If the waste is without sufficient labeling (partial label or none), determine what the material is or is most likely to be by asking the waste contributor.
 - Sometimes the appearance of the material may be enough for you to determine its general classification.
 - Do not attempt to smell the material to determine its nature.
 - Label the container with what ever you know about the waste and accept it.
 - Use a permanent marker available in the label box to mark the container.



HHW HANDLING PROCEDURE

- Observe the labeling, or lack thereof, on the waste containers.
 - You will occasionally see materials that are clearly household wastes, but about which nothing is known.
 - We can take these and staff will categorize them using the HAZCAT equipment available at each collection site.
 - Label the container with whatever information you have and accept it.



HHW HANDLING PROCEDURE

- If a waste container is found leaking, notify staff that there is a “leaker” and
 - Have the driver pull up to the receiving area or
 - Bring the spill kit over to the vehicle.
- If the leak is minor, you may clean it up. If you are unsure or it is a large spill, ask the Site Coordinator for assistance.



HHW HANDLING PROCEDURE

- You must reject the waste if you see any indication that the waste is commercial, such as:
 - 6" by 6" yellow HAZARDOUS WASTE label or DOT shipping manifest is attached,
 - Containers that are larger than household commodities, or
 - Several full containers of the same material.
- Have a program staff discuss the matter with the contributor.



HHW HANDLING PROCEDURE

- You must reject the waste if you find that it is Prohibited Waste, including:
 - Infectious (including sharps containers),
 - Medications,
 - Radioactive,
 - Explosive (blasting caps and dynamite),
 - Munitions (including bullets and shells), or
 - Commercial compressed gas wastes.
 - NOTE: this does not include aerosol cans or barbecue propane cylinders
- Have a program staff discuss the matter with the contributor.



MATERIAL HANDLING PROCEDURE

- Carefully remove the waste and place it on a cart for transport.



REMOTE COLLECTION EVENT

- Using the carts to transport materials to the sorting table or appropriate packaging area reduces the chances of a spill as well as reducing volunteer fatigue and possible injury associated with frequent lifting.



MATERIAL HANDLING PROCEDURE

- When lifting containers use two hands - when possible place one hand on the bottom of the container.



MATERIAL HANDLING PROCEDURE

- Do not lift a container solely by a handle or the neck if possible.
 - Handles often break off causing the container to fall. Many containers are fragile and break or crack when carried.



MATERIAL HANDLING PROCEDURE

- If you hear hissing, feel heat, see fumes, or cannot identify the material/waste, do not move the container and immediately notify the Site Commander.



MATERIAL HANDLING PROCEDURE

- If you see a precipitate inside or crystals around the cap of a container, do not further handle the container and immediately notify the Site Commander.



MATERIAL HANDLING PROCEDURE

- Do not handle any waste that you are uncomfortable with.
 - Instead notify staff or the Site Commander.



MATERIAL HANDLING PROCEDURE

- When sorting materials, check the container labeling before placing the item in the appropriate drum or tote for transport, even if you believe that you are very familiar with the material.



REMOTE COLLECTION EVENT

- HHW sorting areas inside the collection tent.



REMOTE COLLECTION EVENT

- HHW sorting areas inside the collection tent.



REMOTE COLLECTION EVENT

- HHW sorting areas inside the collection tent.



MATERIAL SORTING

- There are four general categories of hazardous wastes:
 - Oxidizers
 - Flammables
 - Corrosives
 - Poisons or Toxics



RECOGNIZING OXIDIZERS

- Oxidizers are materials which release oxygen and promote combustion of other materials – common examples include:
 - oxygen gas
 - calcium hypochlorite (swimming pool chlorine)
 - ammonium nitrate (35-0-0 fertilizer); potassium nitrate
 - "solid-ox" (a chemical heating agent)
 - hydrogen peroxide, >8% (household type is usually 3%)
 - epoxy or fiberglass hardeners (not the resins)
 - methyl ethyl ketone peroxide (MEKP)
 - concentrated nitric acid, >40%
 - chromic acid (solid only, bright orange crystals)
 - any nitrates, chlorates, perchlorates, peroxides
 - some cosmetics, drugs and tree killing solids



RECOGNIZING OXIDIZERS



RECOGNIZING OXIDIZERS



TIPS HANDLING OXIDIZERS

- Separate solid and liquid oxidizers.
- Oxidizers react with many diverse compounds so they need to be isolated first.
 - In most cases they are not too dangerous by themselves.
- The simplest of these is oxygen gas in a cylinder, but most oxidizers received come in solid form.
- Never store next to flammable and combustible materials, or sources of ignition.



RECOGNIZING FLAMMABLES

- There are many flammable household products, such as:
 - automotive fluids: oil, antifreeze, brake fluid, tranny fluid
 - oil based stains, paints, thinners and some paint strippers
 - lighter fluid, lighters, "Coleman" fuel
 - kerosene, turpentine, naphtha, petroleum distillates
 - methyl ethyl ketone, ethanol, methanol, propanol, isopropanol
 - butane and propane cylinders (small disposable only)
 - floor wax, furniture polish, spot remover
 - solvent based pesticides, tree sealant
 - epoxies, body filler, oil treatment, some carburetor cleaners
 - aerosol paints, adhesives, strippers, preservatives
 - aerosol disinfectants, deodorants, etc.



RECOGNIZING FLAMMABLES



RECOGNIZING FLAMMABLES

Aerosol Cans & Flammable Gas

Note: We do not accept compressed gas cylinders larger than small propane bottles or BBQ size canisters.

Aerosols, like paints, spray lubricants, aerosol poisons and oven cleaners shall be loose packaged into a tote or drum. Arrange the cans so that they will not discharge during transportation. The package is labeled as indicated below.

Do not remove the caps or tips from aerosol cans.

Generic types of Aerosols received:

- Spray Paint
- Oven Cleaner
- Carburetor Cleaner
- Starter Fluid
- Window Cleaner
- Spray Lubricants
- Lacquer Spray
- Hair spray

Brand Names:

- Rustoleum
- Clear Coat
- Easy Off Oven Cleaner
- WD 40
- Krylon
- Shoe Glow
- Raid



AEROSOL UN 1950
(Flammable, Non-Flammable, Corrosive, Poison)
INSIDE CONTAINERS COMPLY WITH
PRESCRIBED REGULATIONS

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TIPS HANDLING FLAMMABLES

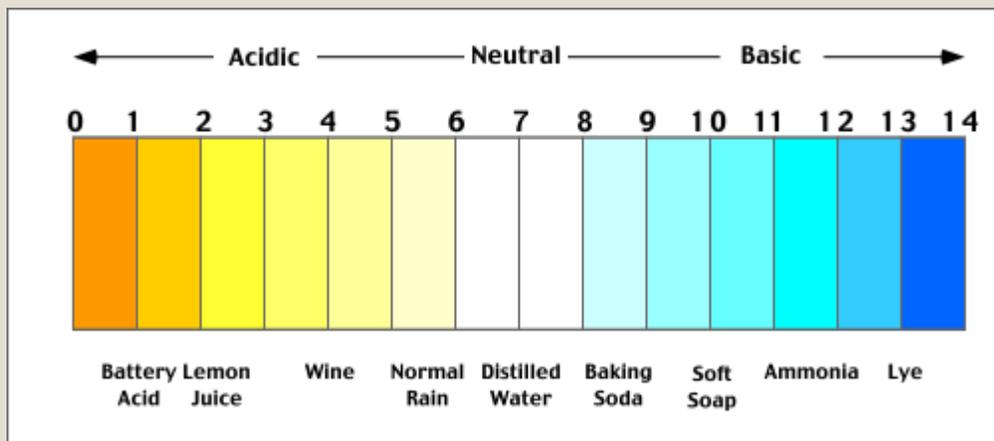
- Separate aerosol and liquid flammables.
- Many flammable products are also poisonous.
 - Since flammable liquids tend to spill and easily ignite, generally be concerned about a waste's flammability before its toxicity.
- Never store next to oxidizers or sources of ignition.
- Take care not to pull buttons off of aerosol cans.
- Take extra care when handling ethers as many can form explosive peroxides upon exposure to air.

TIPS HANDLING FLAMMABLES

- **Organic Solvents** (*aromatic hydrocarbons, aliphatic hydrocarbons, freons, alcohols, ethers, ketones*)
 - Many organic solvents are flammable.
 - Repeated skin contact with a solvent can cause the skin's protective fats and oils to dissolve, resulting in reddening, itching, blistering, and pain.
 - Some solvents can also be readily absorbed through the skin, producing systemic toxic effects.
 - In addition to irritation of the respiratory tract and mucous membranes, inhalation can cause dizziness, drowsiness, headache, lack of coordination and nausea.
 - Exposure over a prolonged period of time may result in damage to the liver, kidneys, lungs, blood, nervous system, and other organs. Carcinogenic, mutagenic and teratogenic effects are not uncommon.

RECOGNIZING CORROSIVES

- Corrosives are chemicals with extreme pH's that corrode other materials, such as steel, glass, and your skin.
 - Because some corrosives react violently with others always further segregate corrosive materials into acids and bases.

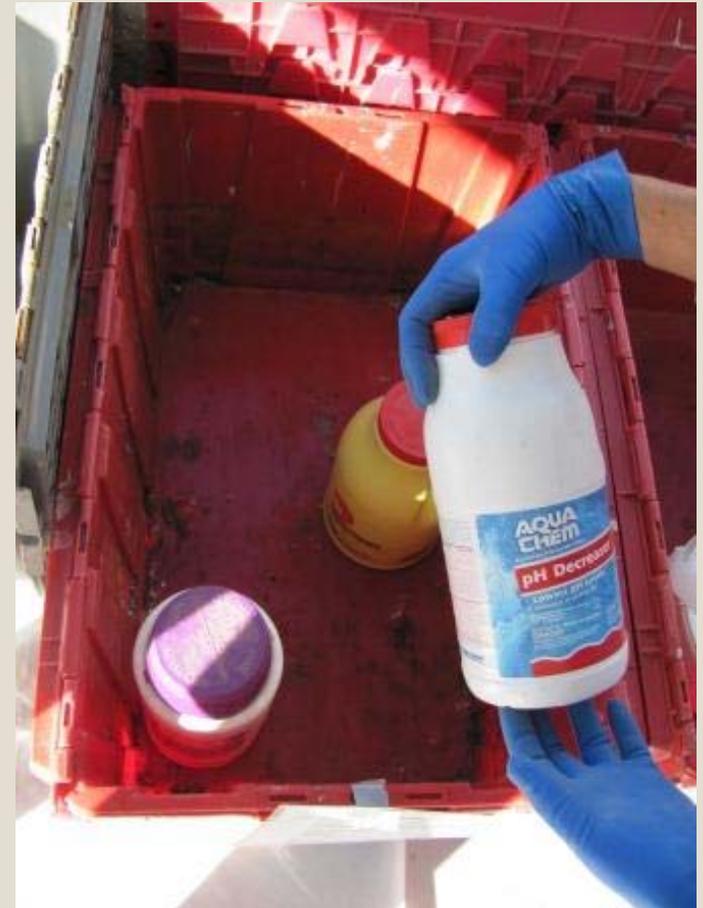
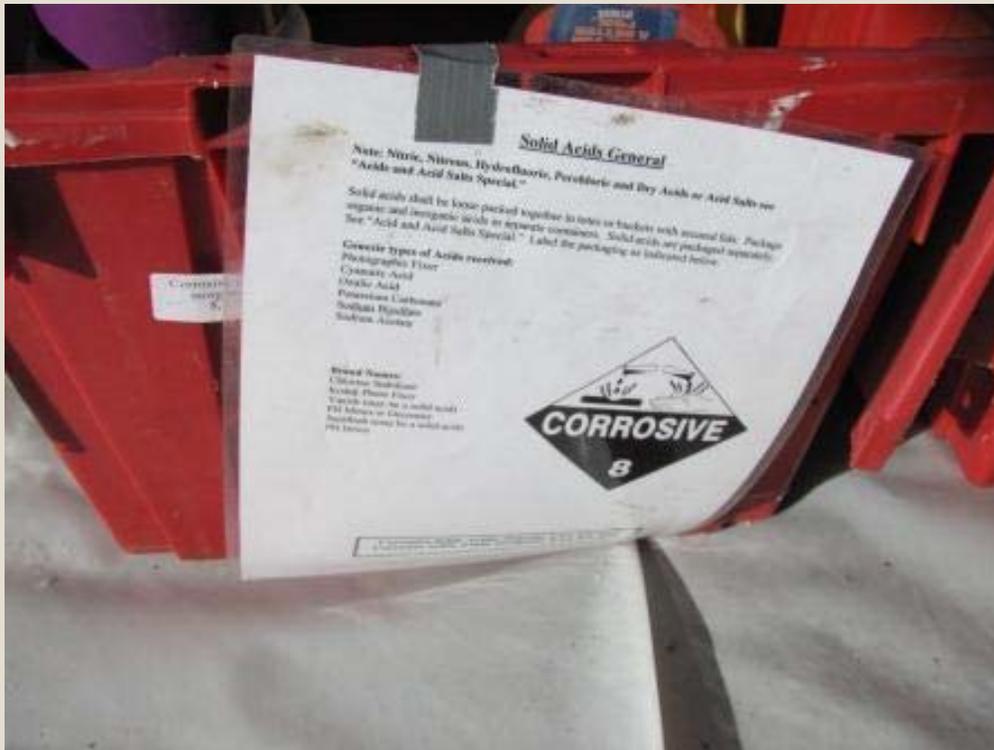


RECOGNIZING CORROSIVES

- Acids – common household types:
 - muriatic acid (concrete cleaning, pool chemical)
 - "Naval Jelly" (phosphoric acid)
 - household batteries, not alkaline, only if leaking
 - acetic acid (photochemical)
 - scale, lime and rust deposit removers
 - some hobby chemicals
 - car batteries contain sulfuric acid



RECOGNIZING CORROSIVES

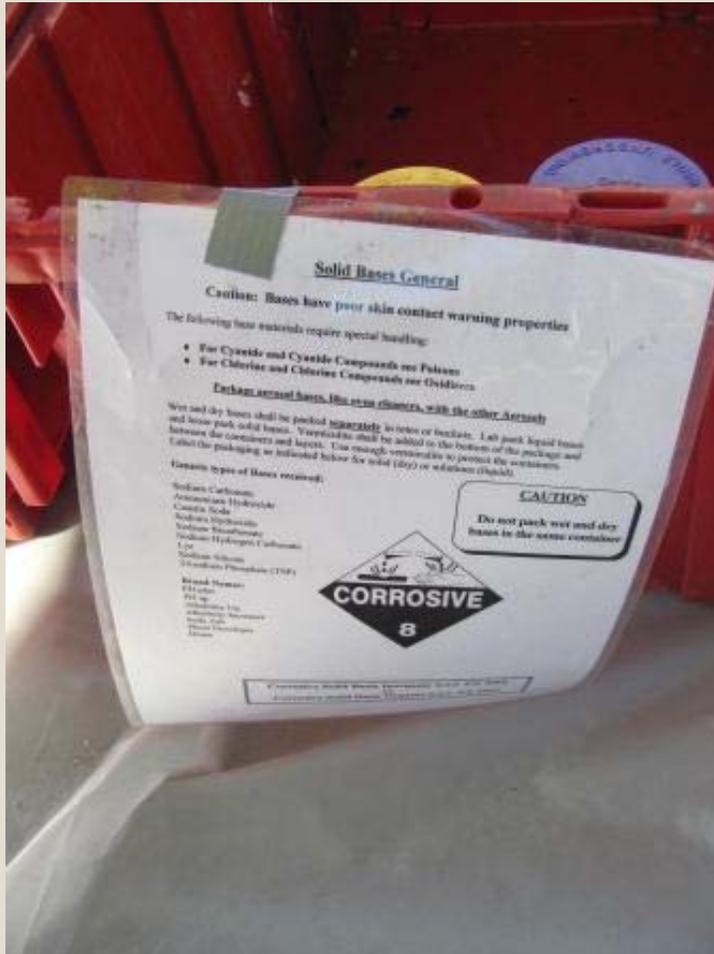


RECOGNIZING CORROSIVES

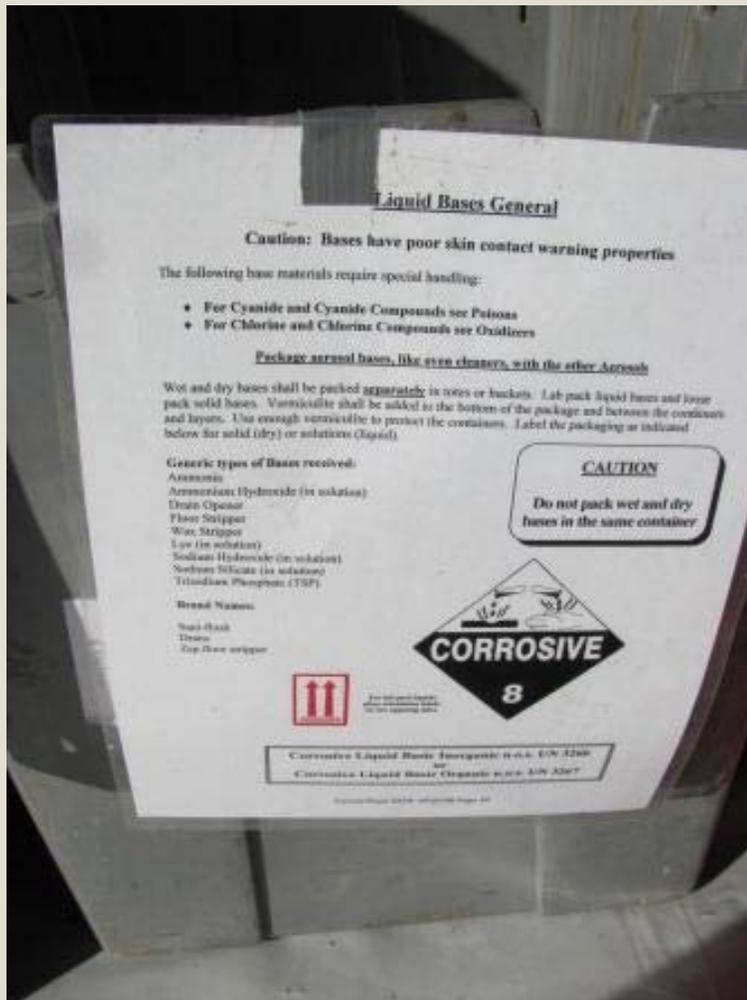
- Bases (also called alkalines or caustics) – common types:
 - lye, sodium hydroxide, potassium hydroxide
 - lime, plaster of paris
 - ammonia containing cleaners
 - bleach (laundry bleach, bathroom cleanser)
 - alkaline batteries, if leaking
 - oven cleaners
 - "Drano" and others (crystal and liquid)
 - "Nair" hair removers
 - most cyanide compounds (some jewelry cleaners)



RECOGNIZING CORROSIVES



RECOGNIZING CORROSIVES



TIPS HANDLING CORROSIVES

- Separate solid and liquid acids and bases.
- Do not package ammonia and chlorine products together - the resulting reaction produces poisonous chlorine gas.
- NEVER package cyanide compounds with acids.
- Corrosives can seriously burn body tissue on contact as well as cause dermatitis and damage to eyes, respiratory tract and mucous membranes.
- Many corrosives may cause delayed injury, particularly bases. The absence of immediate symptoms may prolong exposure and as a result, cause even more severe injuries
- Any body parts exposed to corrosives must be washed immediately and eyes should be flushed for at least 20 minutes.

TIPS HANDLING CORROSIVES

- Handle hydrofluoric acid (HF or hydrogen fluoride) with extreme caution:
 - The acid goes easily and quickly through the skin and into the tissues in the body where it damages the cells and causes them to not work properly.
 - Skin contact causes severe burns and skin ulcers.
 - Often workers exposed to low concentrations of hydrofluoric acid on their skin do not show effects right away. Severe pain at the exposure site may be the only symptom for several hours. Visible damage may not be shown until 12 to 24 hours after the exposure.
 - Exposed individuals must seek medical treatment as soon as possible. Calcium gluconate (a calcium sugar) gels, solutions, and medications are used to neutralize the effects.

RECOGNIZING POISONS

- Whatever is left should be treated as a poison:
 - thermometers, liquid mercury
 - chlorinated benzene or phenol derivatives
 - noncorrosive photochemicals
 - disinfectants (e.g. "Lysol")
 - rug and upholstery cleaners, dry cleaning solvent
 - mothballs, flea collars, fly paper
 - products containing any of the following metals: arsenic, barium, cadmium, chromium, copper,
 - lead, mercury, nickel, selenium, silver, thallium, zinc
 - pesticides
 - any unclassifiable organic materials that are left



RECOGNIZING POISONS



- *PESTICIDES (suffix = 'cide), such as:* DDT; 2,4-D; 2,4,5-T; Silvex; arsenates; pyrethrins; rotenone; nicotine; carbaryl; sevin; temik; aldicarb; carbofuran; baygon; aldrin; endrin; lindane; dieldrin; kepone; heptachlor; chlordane; malathion; parathion; methyl parathion; diazinon; dichlorvos; chlorpyrifos; toxaphene; pentachlorophenol; penta and many others.
 - NOTE: language on the container may tell you that this material is toxic.
 - Generic types include: Ant Traps, Fertilizers, Pyrethrins, Root Stimulator, Systemic Herbicides, Insect Spray, Weed Killers, Algae Control, Boric Acid, Rodent Bait, Rose Food
 - Brand names include: Raid, Black Flag, Doomsday, Round-up, Weed-B-Gone, Baygon, Kilz-All, Sevin Dust, Chlordane, Scotts, Weed-n-Feed

TIPS HANDLING POISONS

- Separate liquid and solid poisons.
- Handle benzene with extra care as it is a known carcinogenic.
 - It has a relatively short latency period (the interval between exposure to a carcinogen and the clinical appearance of disease).
 - Chronic exposure to a low concentration of benzene may damage the bone marrow.
- Spill kits must be used for cleaning up liquid spills of mercury.



TIPS HANDLING POISONS

- ***Chlorinated Solvents*** (*methylene chloride, chloroform, trichloroethylene*)
 - All chlorinated solvents can cause dermatitis (chapping, drying, rashes) on repeated contact with the skin, since they remove the protective fats and oils.
 - Most of these compounds have an anesthetic or narcotic effect, causing people to feel intoxicated if overexposed.
 - Many of the compounds are highly irritating to the membranes around the eyes, and in the nose, throat, and lungs.
 - Some of the chlorinated solvents are strong systemic poisons which damage the liver, kidneys, nervous system, and other organ system.
 - With few exceptions, most of the chlorinated hydrocarbons are non-flammable.

MISCELLANEOUS WASTES

- There are multiple miscellaneous wastes:
 - Unknowns
 - Paints
 - Batteries
 - Waste Oil and Filters
 - Antifreeze
 - Road Flares
 - Mercury
 - Smoke Detectors
 - Fluorescent Lamps
 - Electronics
 - Ink & Toner
 - Photo Chemicals
 - Soaps and Waxes



UNKNOWNNS

- Volunteers must not sort unknowns or attempt to identify unknown materials by touching or smelling the material.
 - Unknown materials may only be tested/identified and sorted by staff.



PAINTS

- Latex and oil based paint and other paint related materials such as stains, varnish and primers which are not leaking will be sorted together.
 - When large quantities of paint related materials are collected during an event, sort the different paints into separate baskets.
- If a paint container is weak or leaking, it must be placed in a plastic bag, tote or bucket.



LEAD ACID BATTERIES

- Non-leaking lead acid batteries will be sorted into a battery box. Protect the batteries against short-circuiting by arranging the batteries so that the terminals will not touch other terminals.
 - If necessary, place duct tape over battery top or side terminals to protect them from contacting metal objects or batteries.
- Leaking lead acid batteries will be placed in a tote or bucket.



DRY BATTERIES

- Sort dry batteries into a 5-gallon plastic buckets.



WASTE OIL

- Waste oil will be poured into a 55-gallon metal waste oil drum.
 - Waste oil drums are normally pre-labeled.
- Containers of waste oil which are suspected of containing solvents, or other contaminants shall be package separately or with the flammable liquids.



OIL FILTERS

- Oil filters will be placed into a bucket or tote.



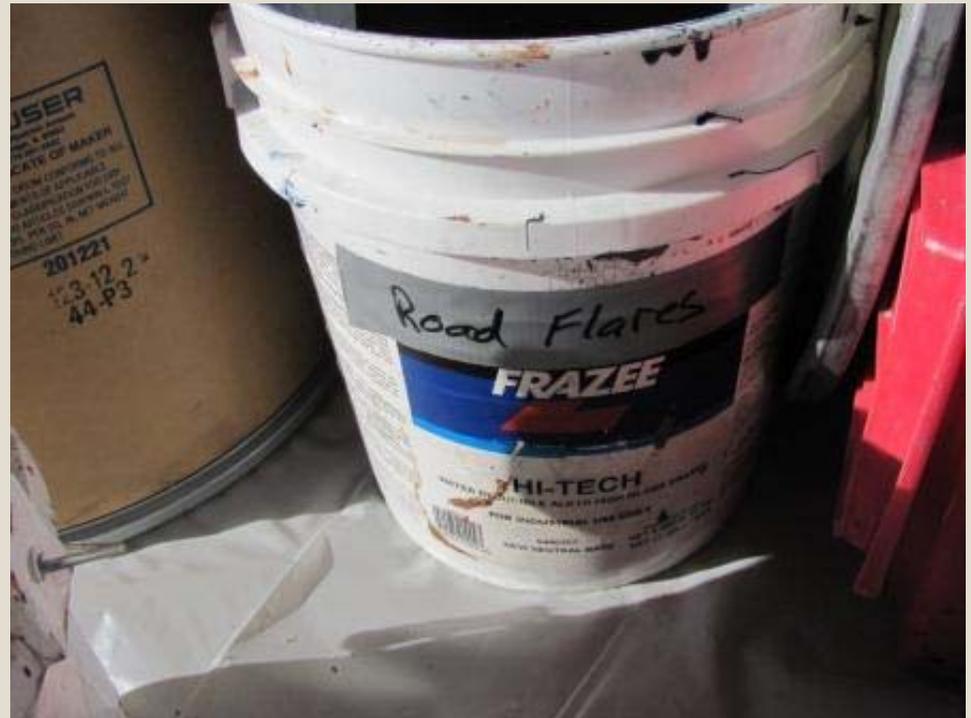
ANTIFREEZE

- Pour waste antifreeze into a waste antifreeze drum.
 - Antifreeze drums are normally pre-labeled



ROAD FLARES

- Road flares will be placed into a tote or bucket.



MERCURY

- Place mercury containing thermometers and thermostats in the same bucket or tote.



MERCURY LAMPS

- Fluorescent lamps (4' or 8' tubes) will be placed in cardboard cylinders or lamp boxes.
- Place smaller fluorescent lamps into a bucket or pail.
- Take care when placing fluorescent lamps to ensure they do not break.



COMPUTERS & PERIPHERALS

- Computers and computer peripherals (processing unit, monitor, printer, scanner, key board, mouse, etc.) will be collected as long as they are from residents.
 - No business computers will be collected at the sites.
- Televisions, DVD/VCR players and other electronics are not accepted through this program.



INK & TONER

- Ink or toner cartridges will be placed into a bucket or tote.



PHOTO CHEMICALS

- Liquid photo chemicals can be packaged in the Liquid Acids General (Fixers & Stop Bath) container or Bases General (Developer) container if a pH determination is made.
- However, when large amounts of these materials are received photo chemicals can be packaged separately into a bucket or tote.



SOAPS AND WAXES

- Soap and Wax will be placed into a bucket, tote or drum.
- Generic types of Soaps and Waxes include:
 - Bar and Liquid Soaps
 - Auto Wax and Polish
 - Floor Wax
 - Laundry Detergents
 - Polishes
 - Rug Shampoo
 - Window Cleaners
 - Brasso
 - Cleaners (e.g. 409, Mr. Clean, Spic-n-span)



REMOTE COLLECTION EVENT

- Sorting process in action.



REMOTE COLLECTION EVENT

- Bulking process in action.



SITE BREAKDOWN

- Once the collection event has ended volunteers may stay to help with waste packaging and clean-up, but do not have to.
- If you would like to assist with packaging/labeling you must work with staff member and follow their instructions to the letter.



KNOWLEDGE REVIEW

- Explain how you will know if you are scheduled for an event.
- State what time you are to arrive for the collection event.
- Explain what to do if you cannot make the event.
- List the four major types of hazardous wastes.
- List six miscellaneous wastes.
- Describe how to approach a waste contributors vehicle.
- Describe how to remove waste containers from the vehicle.
- Describe how to move wastes to the sorting area.
- Explain what to you must do before leaving the event.



ANY QUESTIONS?



WRAP UP

■ Final Tips to Remember:

- If unsure, ask questions – “there are no dumb questions”
- If any spills or unknown wastes are found, inside or outside of vehicles, get help immediately.
- If you do not feel good or are hurt in any way, notify staff immediately.
- If you unable to report to a collection event, call 520-690-5749.



KNOWLEDGE ASSESSMENT

■ INSTRUCTIONS:

- Make sure you write your name on the assessment form.
- You may use your written materials to answer the questions.
- Please bring any “impossible” questions up to the instructor.
- Please remain quiet once you are finished.
- Do not leave as we will review the answers together.



ANY FINAL QUESTIONS



THANK YOU FOR VOLUNTEERING!

