LABORATORY SAFETY

Presented by

The Office of Risk Management

Loss Prevention

PRE-TEST

1. Electrical safety should not be ignored in the laboratory. T or F
2. Inspections of laboratories are not necessary. T or F
3. It is acceptable to eat and drink in a laboratory. T or F
4. Who is responsible of supplying PPE?
5. What does MSDS stand for?

Safe laboratory procedures and training are needed for everyone!

WHY IS LABORATORY SAFETY IMPORTANT?

- TO PREVENT:
  - adverse health effects from exposure to chemicals
  - exposure to organisms, diseases, etc. in laboratories
  - laboratory equipment hazards - if not maintained properly

LAB SAFETY COURSE OBJECTIVES

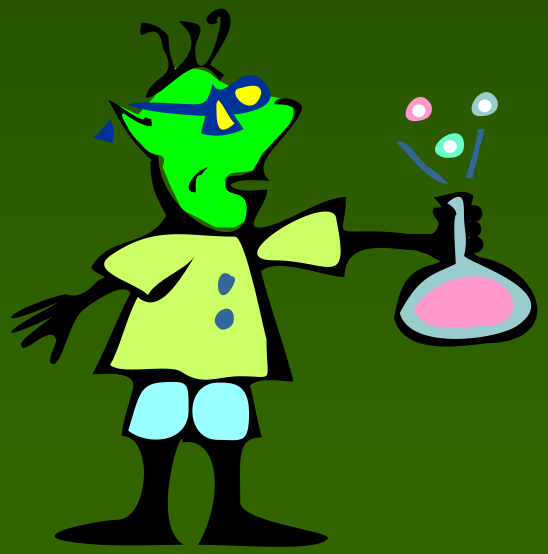
- To show importance of written laboratory program
- To show importance of safety equipment and personal protective equipment
- To show importance of care of equipment

Lab safety must be taught to :

- all employees, including service groups
- undergraduate students
- graduate students
- professors
- visitors

REVIEW LABORATORY SAFETY WHEN:

- new employees
- new procedures
- a change in procedures
- new equipment



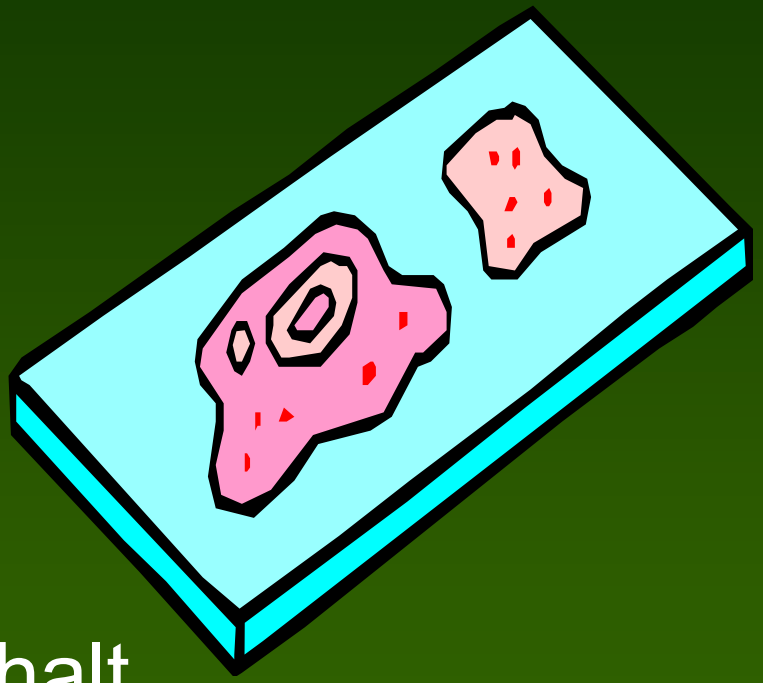
LAB SAFETY CONT..

LABORATORY PROCEDURES MUST BE SITE SPECIFIC !

based on your lab needs, conditions, and equipment

TYPES OF LABORATORIES

- Pathology
- Chemistry
- Biology
- Radiation
- Soils
- Concrete/Asphalt



Laboratory Policies and Procedures

Must be:

written and available

AREAS TO COVER

- General procedures or rules
- Glassware
- Material handling and care
- Equipment
- Safety equipment
- Electrical safety
- Disposal procedures
- Emergency response plans
- Inspections

General Procedures or Rules:

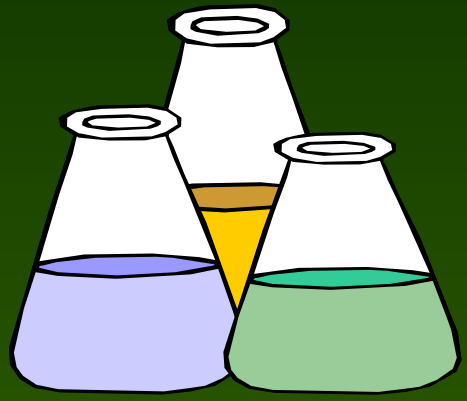
- usually common to all areas

General Procedures or Rules:

- **no** food or drink allowed in the laboratory
- **no** mouth pipetting
- individuals **not** allowed to work in the laboratory alone
- wear required personal protective equipment
- **no** smoking in laboratory
- maintain good housekeeping habits

GLASSWARE PROCEDURES

- Storage
- Proper use
- Cleaning
- Cleaning up broken glassware
- Disposal of broken glassware

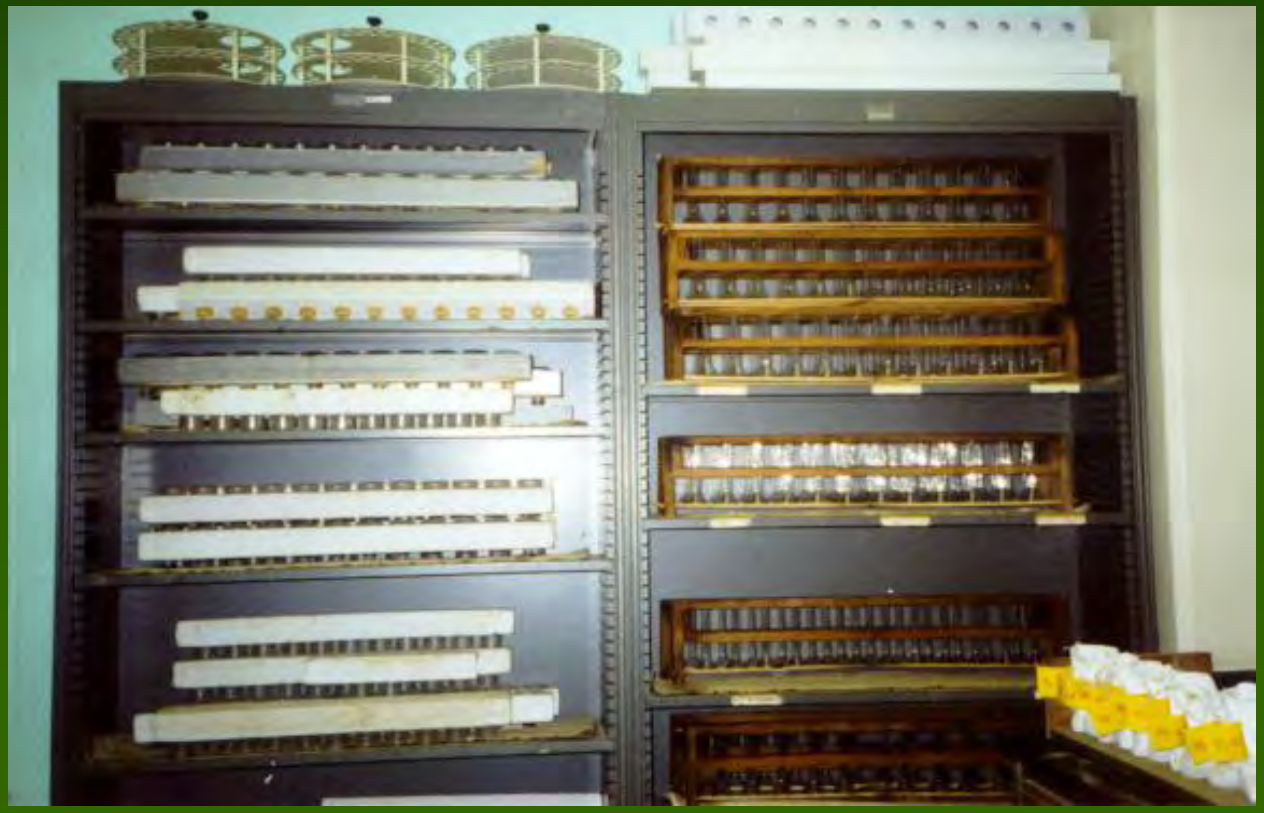


Glassware Handling

Is this what your lab looks like?

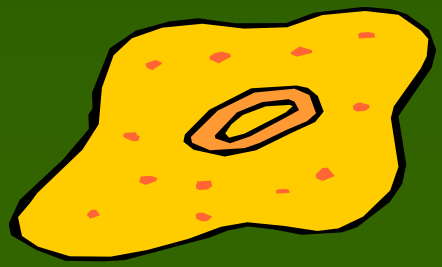
Glassware handling cont

- Or does it look like this?



Laboratory Materials

- Can include
  - chemicals
  - plants
  - animals
  - pathogens
  - organisms

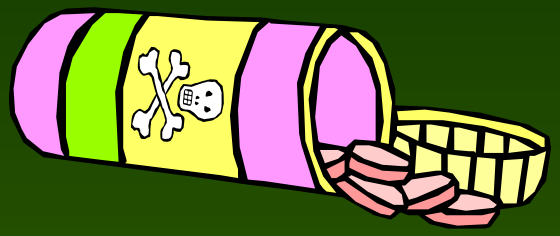


Procedures for handling chemicals

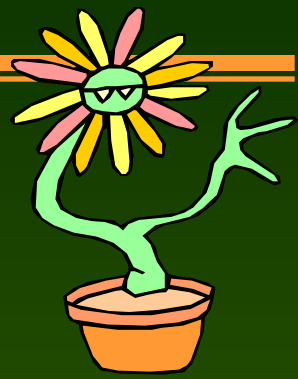
- proper labeling, including wastes
- proper storage
  - storage cabinets
  - store compatible chemicals together
  - rooms properly vented & correct temperature

Procedures for handling chemicals cont.

- Maintain a current inventory
- Purchasing procedures
- Proper handling
  - **use label or MSDS**
  - **never** test by taste or odor
  - acids poured into water **never** vice versa
  - take precautions and use proper equipment when stirring or heating flammable liquids
  - follow “industry standards” for labeling all chemicals



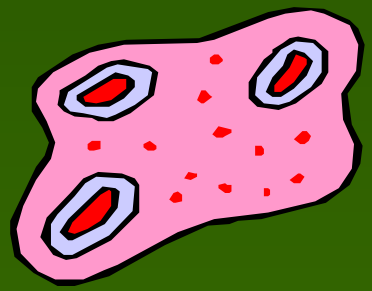
Handling animals and plants



- Procedures for caring for animals and plants including feeding and watering
- Procedures for cleaning cages
- Procedures for cleaning and/or decontaminating rooms or locations
- Procedures for entering & leaving contaminated areas
- Procedures for handling the animals or plants
- Procedures for animal bites or scratches
- Procedures for disposal to prevent spread of disease

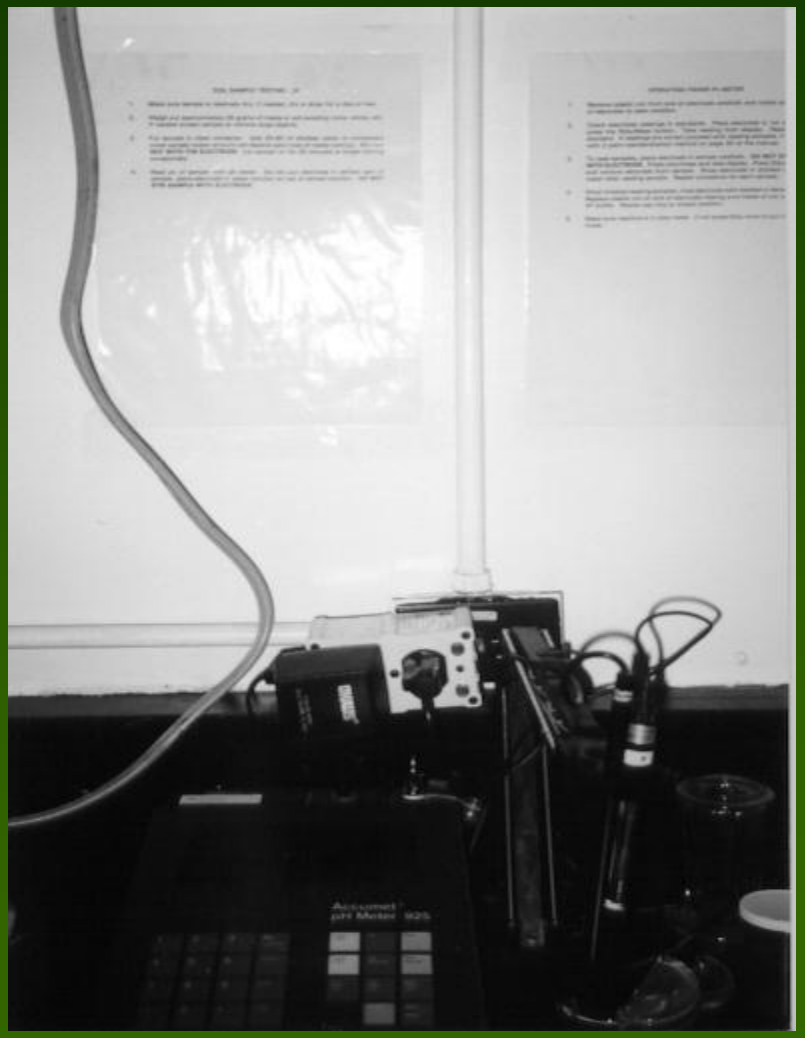
Handling of diseases or organisms

- Allow **only** authorized individuals in infectious disease laboratories
- Do **not** allow individuals to work alone
- Procedures for proper use of equipment and maintenance
- Use proper containers for transportation, incubation, and storage
- Labeling of laboratories and cultures
- Proper disinfecting procedures
- Hygiene procedures
- Procedures for exposure or release of material



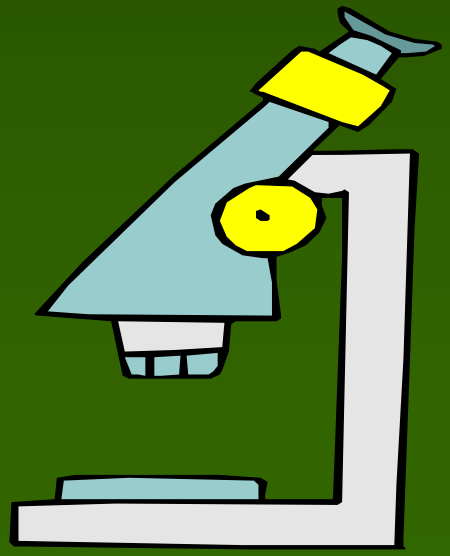
Handling and Using Lab Equipment

- Proper installation
- Training on proper use
- Manuals or written procedures available
- Inspections
- Maintenance
- DOCUMENT



EQUIPMENT INCLUDES:

- Meters
- Refrigerators
- Autoclaves
- Scales
- Hoods
- Drying oven
- Compressed gas cylinders
- Bunsen burners



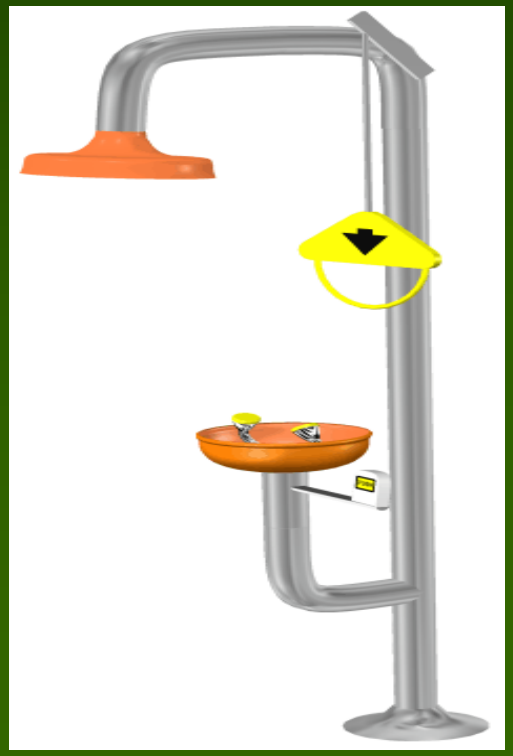
Lab Equipment

Which picture represents a proper hood?

SAFETY EQUIPMENT

- proper equipment must be available
- requires training for the location so individuals know how and when to use equipment appropriately
- training on the correct maintenance & storage is also necessary

SAFETY EQUIPMENT



- FIRST AID AND MEDICAL TRT
- EMERGENCY EQUIPMENT
- SHOWERS, EYEWASH STATIONS
- MSDS'S
- PPE

First Aid and Medical Treatment

- First aid kit available and properly stocked (nothing expired)
- Trained first aid attendant or
- Medical facilities within 15 minutes
- Emergency numbers posted

Emergency Equipment

- Fire blankets
- Fire extinguishers
- Emergency notification system
- Unrestricted means of communication
- Any other emergency equipment needed for your specific laboratory needs

Emergency Showers & Eyewash Stations

- Immediate washing of the skin and eye with generous amounts of water is the most effective first aid treatment for chemical burns (unless chemical reacts unfavorably to water-MSDS)

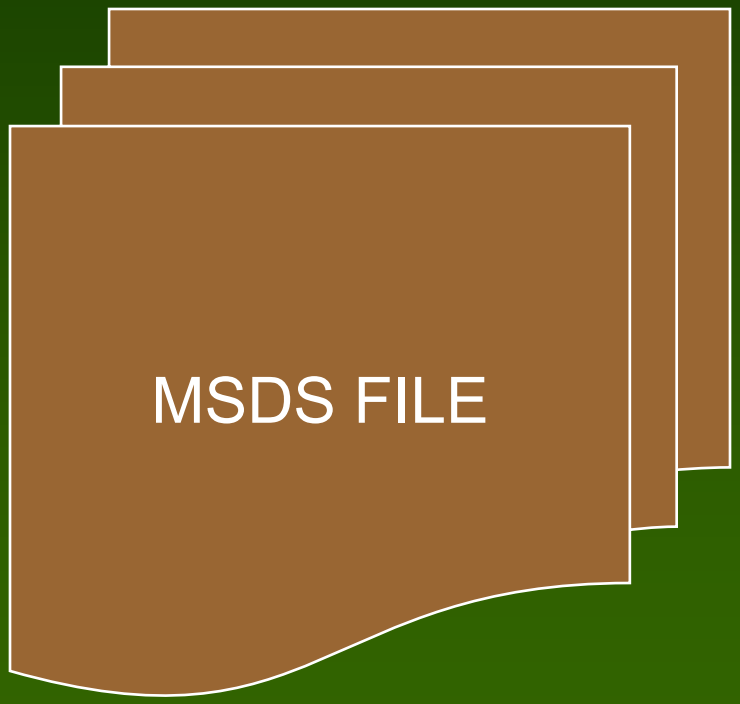
Emergency Showers and Eyewash Stations

- must be available
- showers must be tested for proper operation with results documented

Alternatives to Installed Showers and Eyewashes

- Portable showers or eyewashes
- Attachments that connect to existing faucets
  - must supply at least 15 minutes of continuous water
  - must stay on until turned off

Material Safety Data Sheets, (MSDS)



- required for each chemical
- requires employee and student review
- must be accessable for employees/student

MSDS Information Includes:

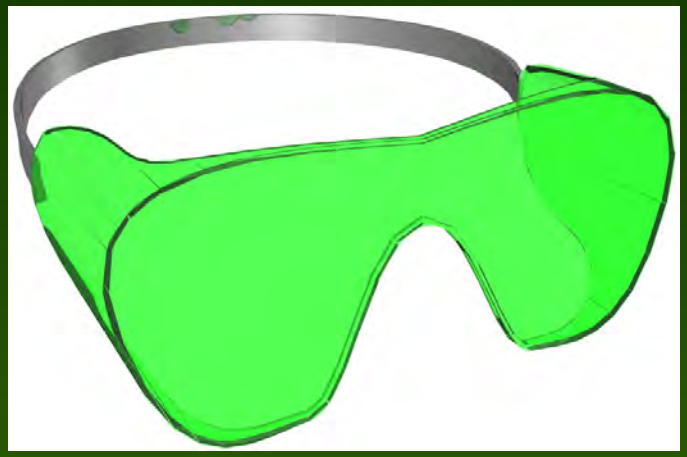
- Nomenclature including chemical family and formula
- Hazardous ingredients
- Physical data
- Fire and explosion hazard
- Health hazard
- Spill and leak procedures
- Special protection information
- Storage and handling precautions

Personal Protective Equipment

- AGENCY MUST:
  - Provide PPE for all employees
    - at no cost to the employee
      - train employees how to use PPE properly
      - train employees on the limitation(s) of PPE
      - train employees in proper care, storage, and useful life, and disposal of PPE

Appropriate PPE:

- aprons,lab coats
- gloves-latex,nitrile,neoprene
- goggles, face shields, safety glasses
- respirators-full, partial, dust mask
- noise protection



ELECTRICAL SAFETY

- Protection of employees and equipment
- inspect panels and plugs
- GFIs (specified by code)
- surge protectors
- inspection & reporting programs

DISPOSAL PROCEDURES

- chemical wastes
- organisms, diseases, animals
- glassware
- spills
- sharps

DISPOSAL PROCEDURES CONT.

- Trained persons designated to handle disposal
- Meet all required rules and regulations
- Proper collection containers
- Waste collection contracts
- Does not expose humans, animals, plants, etc upon disposal - may include decontamination, sterilization, incineration, autoclaving

EMERGENCY RESPONSE PLAN

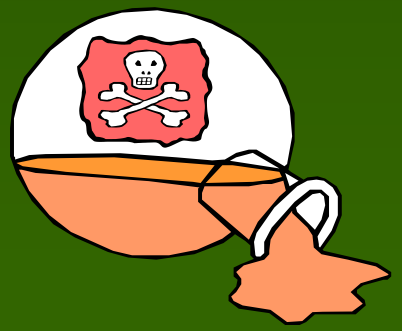
- agencies should develop an emergency response plan *BEFORE* an emergency
- review with employees (students) make sure they understand the plan completely

Emergency Response Plan should include:

- recognizing emergencies
- lines of authority
- methods of communication
- safe sites and evacuation routes
- site security and control

Emergency Response Plan should include cont.:

- decontamination procedures
- provisions for medical treatment
- emergency alerting and response procedures
- PPE and emergency equipment for clean-up
- follow up



INSPECTION OF LABORATORIES

- Develop inspection report appropriate for laboratory
- cover all areas related to laboratory
  - personnel practices
  - operational practices
  - equipment
  - emergency protection equipment
  - materials inventory
  - miscellaneous

CHEMISTRY LABORATORY
SAFETY INSPECTION REPORT

Building_____

Department_____

Floor_____Room(lab)_____
Teaching____Research___Both___Neither

I. Personal Practices

	YES	NO	N/A
Is protective clothing required in lab?			
Is eye protection required and used?			
Are food and beverages stored and eaten in laboratories?			
Are "**NO SMOKING**"signs posted in prohibited areas?			
Are eye protectors provided where machines or operations present the hazards of flying objects, glare, liquids, or radiation?			
Are only approved explosion-proof refrigerators used for cold storage of flammable liquids?			
Are chemical eye goggles, face shields, aprons, gloves, and other protective equipment provided and used when the nature of the work requires it?			
Are portable body shields available?			

II. Operational Practices

	YES	NO	N/A
Are the Lab Safety Regulations available?			
Is an inventory of carcinogens available?			
Are hazardous waste appropriately containerized and labeled?			
Are chemicals properly shelved (lip on shelf to prevent falling; small containers high, large ones low)?			
Are laboratories locked when not in use?			
Are special containers for broken glass provided and specially labeled? (They should be emptied periodically by a custodian.)			

	YES	NO	N/A
When pipeting, are squeeze bulbs or similar devices used?			
Are chemicals properly labeled?			
Is storage of material such that it is stable and secure against sliding, collapse, falls, or spills?			
Are storage areas kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage?			
Are only approved containers used for storage of flammable materials?			
Are there more than 10 gallons of flammable liquids stored outside a flammable liquid storage cabinet or in safety containers?			
Are incompatible chemicals stored separately? (See list in Safety Manual)			
Are peroxidizable chemicals labeled as to the date of opening and tested or disposed of within six months? (See Safety Manual)			
Are dry ice and cryogenic gases like liquid nitrogen stored in well-ventilated areas(not cold rooms)?			
Who is the person(s) in charge of hazardous waste in the laboratory? (This includes chemical and biological waste.)			
What is the laboratory's procedure for disposing of used sharps (needles, syringes, scalpels, razor blades, etc.)? Note: Glass and sharps should be disposed of separately.			
Are the procedures for the disposal of materials which are biological hazards known and followed by all laboratory personnel?			
Are biohazard-contaminated work areas routinely and immediately disinfected after each operation?			
If you have a laminar flow hood or a biological safety cabinet, was it certified within the past year?			
Are all exits maintained to provide free and unobstructed egress from all parts of the building?			

	YES	NO	N/A
Are all exits free of locks or fastening devices that could prevent free escape?			
Are flammable storage cabinets labeled "FLAMMABLE - KEEP AWAY"?			
Are all floors kept clean and dry?			
Are aisles and passageways clear of all obstructions?			
Are the lighting levels such that good illumination is provided in all walking, working, and service areas?			
Are only knowledgeable individuals operating autoclaves and centrifuges?			

III. Equipment

	YES	NO	N/A
Do fume hoods operate safely (85 fpm with sash open, no leaks in duct work/hood; lights and water available in hood)?			
Are compressed gas cylinders properly secured?			
Do empty cylinders and/or reserve cylinders have caps on?			
Are electrical receptacles and plugs grounded?			
Is there a limited use of extension cords?			
Is the wiring frayed or broken?			
Are all compressed gas cylinders (whether full or empty) secured to prevent falling?			
Are compressed gas cylinders legibly marked with the name of contents (example: Hydrogen)?			
Are protection caps in place on compressed gas cylinders not in use?			
If you have a laminar flow hood or a biological safety cabinet, was it certified within the past year?			
Are all new electrical installations and modifications or repairs made by a qualified electrician?			
Does the interior wiring system have a grounded conductor: i.e., 3-wire system?			
Do all electrical appliances have UL approval?			

	YES	NO	N/A
Are the cords of all electrical equipment in good condition?			
Are cords used properly (Not run under rugs, etc.)?			
Are circuit breaker panels and cut-off switches located so as to be readily accessible?			
Are vacuum pumps guarded?			
Are the hoses for Bunsen burners in good condition?			

IV. Emergency Protection Equipment

	YES	NO	N/A
Are fire extinguisher available?			
Are fire blankets available?			
Are safety/eye wash showers accessible and in working order?			
Do all laboratories using caustic or corrosive chemicals have quick access to an emergency eyewash station?			
Have all laboratory personnel practiced using the eyewash station?			
Are sufficient washing facilities (including eye washes and deluge showers) available for all persons required to handle liquids that may burn, irritate, etc.?			
Are fire alarm pull stations available?			
Are extinguisher available where flammable or combustible liquids are stored?			
Are portable fire extinguisher maintained full charged and operable and kept in designated locations?			
Are all laboratory personnel aware of the procedures to be used in a fire or other emergency?			
Are all laboratory personnel tainted in the proper use of fire extinguisher?			
Are sufficient exits available in case of fire or other emergency, with an alternate escape means provided?			
Are exits marked and readily visible?			
Are emergency telephone numbers prominently posted on phone?			

WEB ADDRESS

- http://www.doa.state.la.us/orm/lp.htm

POST-TEST

1. Laboratory equipment does not require regular maintenance. T or F
2. It is acceptable to eat and drink in the laboratory. T or F
3. What is the most effective first aid treatment for chemical burns?
4. Chemicals should be stored according to compatibility. T or F

POST-TEST

5. Fume hoods should be used for chemical storage. T or F
6. What does MSDS stand for?
7. What is some of the information an MSDS can provide?
8. Electrical safety should not be ignored in the laboratory. T or F
9. Name PPE that might be used in the lab.

POST-TEST

10. Who should receive lab safety training?
11. The same laboratory procedures apply to every lab. T or F
12. Who is responsible for supplying PPE?
13. Inspections of laboratories are not necessary. T or F
14. Chemical wastes can be disposed of in the regular trash. T or F

POST-TEST

15. There is no need to test emergency showers. T or F
16. Developing your emergency plan as an emergency is occurring is the best method of development. T or F

THANK YOU FOR ATTENDING