

**MOUNTAIN HOME SCHOOL DISTRICT NO. 193
MOUNTAIN HOME, IDAHO**

PROCEDURES

Section 900.2, Pages 1-36

CHEMICAL HYGIENE PLAN

INTRODUCTION

The purpose of the Chemical Hygiene Plan is to increase student and staff safety by establishing chemical storage, handling, and lab safety guidelines and is by no means limited solely to the chemistry lab or storeroom.

The Chemical Hygiene Plan includes policies, procedures, and responsibilities designed to develop an awareness of potentially hazardous conditions or chemicals in the laboratory and to train personnel in appropriate safe working conditions.

The responsibility and success of implementation of this plan is shared by students, parents, teachers, maintenance staff, school personnel, school administration, district administration, school board, and the Chemical Hygiene Officer.

This plan is not designed to replace or supersede the best professional judgment of teachers in the sciences, but to compliment it through outlined responsibilities and lab safety guidelines.

Due to the nature of teaching a lab science, it is impossible to foresee in advance all possible hazards and dangers in the laboratory/ science classroom. However, this Chemical Hygiene Plan along with other staff efforts establishes a reasonable good faith attempt at protecting our students and staff.

- (i) Science laboratories should be used for laboratory procedures only.
- (ii) It is recommended that the number of students in a science laboratory not exceed the number the lab was built to support.
- (iii) Because of the hidden hazards of science labs, those teachers not trained in lab procedures should not use the science labs for teaching purposes.
- (iv) Non-lab instruction must be conducted in an area free from lab equipment, chemicals, and possible chemical residues.

It is important that administrators assume responsibility for building safety. All employees and students will have access to pertinent safety information. When safety concerns arise, employees and students are encouraged to contact the Chemical Hygiene Officer or building Administrator.

This program is for the benefit and protection of all who use the school facility. It contains information on potential chemical hazards and how they should be handled.

Chemical Hygiene Policy Statement

Chemical Hygiene Officer Appointment

In compliance with the Federal Laboratory Standards _____
(school name)

realizes our responsibility for the protection of our employees. We hereby institute the enclosed Chemical Hygiene Plan to assist us in our safety program.

_____ hereby appoints _____
(school name) (Hygiene Officer's name)

to be our Chemical Hygiene Officer. We acknowledge the Chemical Hygiene Officer has the knowledge and authority to implement and enforce our Mountain Home School District No. 193 Chemical Hygiene Plan.

Although we at _____
(school name)
are designating _____
(Hygiene Officer's name)

as our Chemical Hygiene Officer, we realize the success or lack of success of our Chemical Hygiene Plan rests with all of our employees and students.

The ultimate responsibility of the Chemical Hygiene Plan rests with the School Board and the School District Superintendent.

Superintendent Principal

Date Date

I. RESPONSIBILITIES (29 CFR 1910.1450 (e)(3)(vii) and Appendix A(B))

Specific to this Chemical Hygiene Plan for employees, administrators, school trustees, and students all have responsibilities to conform to this standard. The Superintendent is ultimately responsible for chemical hygiene within the school district and must, with other administrators, provide continuing support for Mountain Home School District No. 193's Chemical Hygiene Plan.

A. BUILDING ADMINISTRATORS (29 CFR 1910.1450 & 29 CFR 1910.1450(e)(3)(i) & Appendix A(E))

1. General Responsibilities –

- Appoint a building Chemical Hygiene Officer (CHO) from within the school system.
~ The Chemical Hygiene Officer is :
 - Implement a Chemical Hygiene Plan conforming to the OSHA Lab Standard.
 - Ensure that employees receive training regarding the Chemical Hygiene Plan.
 - Allocate staff time for regular, formal chemical hygiene, and housekeeping inspections, including routine inspections of emergency equipment, and an annual chemical inventory.
 - Maintain a record of all chemical exposures and provide employee access to these records as well as any medical records. Ensure confidentiality of all personal records.
 - Provide resources to ensure that facilities and equipment align with requirements of the Plan.
 - Phase out mercury in the school and/or school district, per Department of Environmental Protection regulations.
 - Ensure that the local Fire Department receives a copy of the annual chemical inventory.
 - Adhere to the intent and procedures of this CHP.

B. CHEMICAL HYGIENE OFFICER (29 CFR 1910.1450 & 29 CFR 1910.1450(e)(3)(i) & Appendix A(E))

1. General Responsibilities –

- Work with the administration and science department staff to develop and implement appropriate chemical hygiene policies and practices.
- Maintain current knowledge of legal regulations regarding laboratory and chemical safety.
- Maintain communication with administration regarding the CHP.
- Know the safety equipment.
 - ~ The location of eyewash fountains, safety showers, fire blankets, fire extinguishers, first aid kits, and emergency exits
 - ~ How to respond in case of an emergency
 - ~ How to use the safety equipment

- ~ Those expected to use the equipment (e.g. fire extinguishers) must receive proper training
- Know the hazards of the materials being used.
- Dispose chemical wastes according to Department of Environmental Quality at <https://www.epa.gov/sites/production/files/2015-10/documents/workbk.pdf>
<https://www.deq.idaho.gov/pollution-prevention/p2-for-schools/chemical-roundup-program/>.
- Submit budget for maintenance of lab equipment and inspections.
- Know how to interpret information from a Material Safety Data Sheet (MSDS).
- Do not eat, drink, or apply cosmetics in the laboratory.
- Promptly flush exposed skin with water.
- Drench showers are located _____
- Adhere to the intent and procedures of this CHP.

2. Record Keeping –

- Perform regular safety audits.
- Oversee annual chemical inventory. Provide a copy of the current chemical inventory to the front office and local first responders.
- Maintain Material Safety Data Sheets (MSDS) for science laboratory chemicals.
- Keep records of quarterly inspections of laboratories.
- Keep records of orientation and safety training of new staff.
- Keep records of all laboratory incidents.

3. Training –

- Provide training to colleagues, including administrators, teachers, and facilities staff.
- Train all instructors/staff and students in appropriate emergency procedures, waste disposal, spill cleanup, evacuation routes, and fire emergency notification.
- Coordinate annual review of the Chemical Hygiene Plan (CHP) with science staff.

4. Chemicals –

- Ensure chemicals are inventoried properly.
- Oversee maintenance of appropriate spill kit and materials.
- Coordinate and ensure the proper disposal of chemicals, hazardous and chemical waste, including any excess chemicals annually.
 - ~ Follow local, state, and federal disposal requirements
- Monitor the procurement/purchase, the use and disposal of chemicals and all waste materials according to instructions in the lab, stored and maintained, including determining that facilities and training levels are adequate for the chemicals in use.
- Assume any chemical mixture is more toxic than its most toxic component. Substances of unknown toxicity will be assumed to be toxic.
 - ~ Do not underestimate the risk of any chemicals
- Do not taste any chemical.
- Do not smell chemicals directly.
- Do not pipette solutions by mouth.

- Wash hands with soap and water before leaving the laboratory, even if you have been wearing gloves.

C. TEACHERS (29 CFR 1910.1450 & 29 CFR 1910.1450(e)(3)(i) & Appendix A(E))

1. General Responsibilities –

- Teachers should lead by example and wear personal protective equipment; follow and enforce safety rules, procedures, and practices; and demonstrate safety behavior, and promote a culture of safety.
- Develop good personal chemical hygiene habits. Be a model for good safety conduct for students to follow.
- Each instructor is responsible for keeping his or her workspace clean and is jointly responsible for common laboratory areas.
- Adhere to the intent and procedures of this CHP.
- Know the safety equipment.
 - ~ The location of eyewash fountains, safety showers, eyewash, fire blankets, fire extinguishers, first aid kits, spill kits, and emergency exits
 - ~ Drench showers are located _____
 - ~ How to respond in case of an emergency; and
 - ~ How to use the safety equipment
 - ~ Those expected to use the equipment (e.g. fire extinguishers) must receive proper training.

2. Classroom & Laboratory Instruction –

- Align curriculum with Chemical Hygiene Plan.
- Inspect all equipment/apparatus in the laboratory before use.
- Teach good personal chemical hygiene habits.
- Ensure that students meet their lab safety responsibilities.
- Plan and conduct each laboratory exercise with the least toxic materials.
- Before each activity in the laboratory, weigh the potential risk factors against the educational value.
- Before entering the laboratory/beginning a lab, instruct students on all laboratory procedures that will be conducted.
- Make sure students are wearing the appropriate personal protective equipment (i.e., chemical splash goggles, laboratory aprons or coats, and gloves).
- Discuss and enforce all safety rules, procedures, concerns, and potential hazards related to the laboratory work that students will be performing before starting the work.
- Have an understanding of all the potential hazards of the materials, the process, and the equipment involved in every laboratory activity.
- Educate students on the location and use of all safety and emergency equipment prior to laboratory activity.
- Identify safety procedures to follow in the event of an emergency/accident.
- Provide students with verbal and written safety procedures to follow in the event of an emergency/accident.
- Never leave students unsupervised in the laboratory.

- Never allow unauthorized visitors to enter the laboratory.
- Never allow students to take chemicals out of the laboratory.
- Never permit food, beverages, or gum in the laboratory.
- Keep emergency phone numbers posted near your phone.
 - ~ School Administrator Direct line: _____
 - ~ Fire / Medical Emergency: 911
 - ~ Poison Control Center: 1-800-222-1222
 - ~ Local Sewer Authority: ***Public Works – (Shirley Batchelor) - 587-2108***
- Conduct appropriate safety and evacuation drills on a regular basis.
- Explain in detail to students the consequences of violating safety rules and procedures.

3. Safety & Emergency –

- Plan and conduct each laboratory operation in accordance with the Chemical Hygiene Plan and safe work practices.
- Conduct a general safety inspection and inspect safety and first aid equipment in your room/laboratory quarterly.
- Record the inspection date and the inspector’s initials on the attached equipment inspection tag.
- Be proactive in every aspect of laboratory safety, making safety a priority.
- Read labels carefully to make sure you are using the right chemical.
- Label, use, and dispose of each chemical as required.
- Dispose of all waste materials according to instructions. Follow local, state, and federal disposal requirements.
- Assume any chemical mixture is more toxic than its most toxic component. Substances of unknown toxicity will be assumed to be toxic. Do not underestimate the risk of any chemicals.
- Maintain laboratory safety equipment.
- Maintain spill kits that are consistent with type and amount of chemicals used.
- Notify the administration in writing if a hazardous or possibly hazardous condition (e.g., malfunctioning safety equipment or chemical hazard) is identified in the laboratory and follow through on the status.
- Never use defective equipment.
- Know the location of and how to use the cut-off switches and valves for the water, gas, and electricity in the laboratory.
- Do not taste any chemical.
- Do not smell chemicals directly.
- Do not pipette solutions by mouth.
- Wash hands with soap and water before leaving the laboratory, even if you have been wearing gloves.
- Report any accidents or unsafe conditions to the Chemical Hygiene Officer immediately.
- Promptly flush exposed skin with water.
 - ~ Drench showers are located _____

4. Housekeeping –

- Participate in annual chemical inventory.
- Annually submit a list of experiments and materials needed to the Chemical Hygiene Officer (CHO).
- Maintain communication with Chemical Hygiene Officer.
- Know how to interpret information from a Material Safety Data Sheet (MSDS).
- Obtain and review MSDS prior to requesting new chemical.
- Keep unobstructed access to emergency equipment such as showers, eyewash, fire extinguishers, fire blankets, and emergency exits.
- Keep work areas clean and uncluttered, with chemicals and equipment properly labeled and stored.
 - ~ Clean the work area at the end of each operation or each day.
 - ~ Make sure all gas and water outlets are completely shut off.
 - ~ Return all items used in the experiment to their proper storage location.
- Dispose chemical wastes according to Department of Environmental Quality at:
 - ~ <https://www.deq.idaho.gov/>
 - ~ <https://www.epa.gov/sites/production/files/2015-10/documents/workbk.pdf>
 - ~ <https://www.deq.idaho.gov/pollution-prevention/p2-for-schools/chemical-roundup-program/>
- Secure gas cylinders.
- Clean up any spills on the floor or bench immediately.

D. **STUDENTS** (29 CFR 1910.1450(e)(3)(i) and Appendix A(E))

1. General Conduct –

- Obey all safety rules and regulations.
- Wear appropriate personal protective equipment as instructed.
- Do not engage in inappropriate behavior (i.e. no horseplay), in practical jokes, or boisterous conduct in the laboratory.
- Adhere to the intent and procedures of this CHP.
- Never run in the laboratory.
- Know the safety equipment.
 - ~ The location of eyewash fountains, safety showers, eyewash, fire blankets, fire extinguishers, first aid kits, spill kits, and emergency exits
 - ~ Drench showers are located _____
 - ~ How to respond in case of an emergency; and
 - ~ How to use the safety equipment
 - ~ Those expected to use the equipment (e.g. fire extinguishers) must receive proper training.
- The use of personal audio or video equipment is prohibited in the laboratory.
- The performance of unauthorized experiments is strictly forbidden.
- Never remove any equipment or chemicals from the laboratory.
- Do not sit on laboratory benches.
- Keep work area neat and free of any unnecessary objects.
- Thoroughly clean your laboratory workspace at the end of the laboratory session.
- Do not block the sink drains with debris.

- Never block access to exits or emergency equipment.
- Inspect all equipment for damage (cracks, defects, etc.) prior to use.
- Know the hazards of the materials being used.
- Read labels carefully to make sure you are using the right chemical.
- Do not use damaged equipment.
- Never pour chemical waste into the sink drains or wastebaskets.
- Place chemical waste in appropriately labeled waste containers.
- Properly dispose of broken glassware and other sharp objects (e.g., syringe needles) immediately in designated containers.
- Properly dispose of weigh boats, gloves, filter paper, and paper towels in the laboratory.

2. Proper Clothing Attire in the Laboratory –

- Always wear appropriate eye protection (i.e., chemical splash goggles) in the laboratory.
- Wear disposable gloves, as provided in the laboratory, when handling hazardous materials. Remove the gloves before exiting the laboratory.
- Wear a full-length, long-sleeved laboratory coat or chemical-resistant apron.
- Wear shoes that adequately cover the whole foot; low-heeled shoes with non-slip soles are preferable. Do not wear sandals, open-toed shoes, open-backed shoes, or high-heeled shoes in the laboratory.
- Avoid wearing shirts exposing the torso, shorts, or short skirts; long pants that completely cover the legs are preferable.
- Secure long hair and loose clothing (especially loose long sleeves, neck ties, or scarves).
- Remove jewelry (especially dangling jewelry)
- Synthetic fingernails are not recommended in the laboratory; they are made of extremely flammable polymers which can burn to completion and are not easily extinguished.

3. Hygiene Practices –

- Keep your hands away from your face, eyes, mouth, and body while using chemicals.
- Food and drink, open or closed, should never be brought into the laboratory or chemical storage area.
- Never use laboratory glassware for eating or drinking purposes.
- Do not apply cosmetics while in the laboratory or storage area.
- Wash hands with soap and water before leaving the laboratory, even if you have been wearing gloves.
- Remove any protective equipment (i.e., gloves, lab coat or apron, chemical splash goggles) before leaving the laboratory.

4. General Work Procedure –

- Know emergency procedures.
- Conduct only the experiments assigned by the instructor.

- Never work in the laboratory unless authorized to do so. Never work alone or unsupervised in the laboratory.
- Understand the experimental procedure before starting to work in the laboratory.
- Immediately report any spills, accidents, or injuries to a teacher.
- Never leave experiments while in progress.
- Never attempt to catch a falling object.
- Be careful when handling hot glassware and apparatus in the laboratory. Hot glassware looks just like cold glassware.
- Never point the open end of a test tube containing a substance at yourself or others.
- Make sure no flammable solvents are in the surrounding area when lighting a flame.
- Do not taste any chemical.
- Do not smell chemicals directly.
- Do not leave lit Bunsen burners unattended.
- Turn off all heating apparatus, gas valves, and water faucets when not in use.
- Coats, bags, and other personal items must be stored in designated areas, not on the bench tops or in the aisle ways.
- Notify your teacher of any sensitivity that you may have to particular chemicals if known.
- Keep the floor clear of all objects (e.g., ice, small objects, and spilled liquids).

5. **Emergency Procedure** –

- Know the location of all the exits in the laboratory and building.
- Know the location of the emergency phone.
- Know the location of and know how to operate the following:
 - ~ Fire extinguishers
 - ~ Alarm systems with pull stations
 - ~ Fire blankets
 - ~ Eye washes
 - ~ First-aid kits
 - ~ Deluge safety showers
 - ~ Drench showers are located _____
- In case of an emergency or accident, follow the established emergency plan as explained by the teacher and evacuate the building via the nearest exit.

6. **Chemical Handling** –

- Become familiar with the properties and hazards of the chemicals in use.
- Check the label to verify it is the correct substance before using it.
- Wear appropriate chemical resistant gloves before handling chemicals. Gloves are not universally protective against all chemicals.
- If you transfer chemicals from their original containers, label chemical containers as to the contents, concentration, hazard, date, and your initials.
- Always use a spatula or scoopula to remove a solid reagent from a container.
- Never fill a pipette using mouth suction. Always use a pipetting device.
- Do not directly touch any chemical with your hands.

- Never use a metal spatula when working with peroxides. Metals will decompose explosively with peroxides.
- Hold containers away from the body when transferring a chemical or solution from one container to another.
- Use a hot water bath to heat flammable liquids.
- Promptly flush exposed skin with water.
 - ~ Drench showers are located _____
- Never heat directly with a flame.
- Add concentrated acid to water slowly.
- Never add water to a concentrated acid.
- Weigh out or remove only the amount of chemical you will need. Do not return the excess to its original container, but properly dispose of it in the appropriate waste container.
- Never touch, taste, or smell any reagents.
- Never place the container directly under your nose and inhale the vapors.
- Never mix or use chemicals not called for in the laboratory exercise.
- Use the laboratory chemical hood, if available, when there is a possibility of release of toxic chemical vapors, dust, or gases.
- When using a hood, the sash opening should be kept at a minimum to protect the user and to ensure efficient operation of the hood.
 - ~ Keep your head and body outside of the hood face
 - ~ Chemicals and equipment should be placed at least six inches within the hood to ensure proper airflow
- Clean up all spills properly and promptly as instructed by the teacher.
- Dispose of chemicals as instructed by the teacher.
- When transporting chemicals (especially 250ml or more), place the immediate container in a secondary container or bucket (rubber, metal or plastic) designed to be carried and large enough to hold the entire contents of the chemical.
- Never handle bottles that are wet or too heavy for you.
- Use equipment (glassware, Bunsen burner, etc.) in the correct way, as indicated by the teacher.

E. CUSTODIANS

1. Understand and follow chemical and hazardous waste management regulations and best practices.
2. Adhere to the intent and procedures of this CHP.
3. Clean science laboratories and storage areas with caution.
4. Report chemical spills to CHO and/or administrator.
5. Do not clean up spills without proper training.

F. GENERAL LABORATORY RULES AND PROCEDURES

1. The laboratory must be well ventilated.
 - Air for laboratory ventilation shall directly flow into the laboratory from non-laboratory areas and out to the exterior of the building.
 - Ventilation must be checked a minimum of every 3 months.
 - Ventilation must be appropriate.

2. In the event of an accident fill out an accident report describing the accident in detail.
3. Do not operate electric equipment with wet hands.
4. Have appropriate types and sizes of fire extinguishers with training in use.
 - Tri-class ABC and Halon fire extinguishers are appropriate for laboratories.
 - Carbon dioxide fire extinguishers are inappropriate for laboratories.
 - A Class D fire extinguisher should be available when working with flammable solids.
 - Fire extinguishers should be inspected every 6 months.
5. Do not obstruct fire exits.
6. Have an alternate evacuation route in the event your primary route becomes blocked.
7. Neutralizing chemicals such as, spill kit, dry sand, kitty litter, and other spill control materials should be readily available in any lab which chemicals are used.
8. Safety showers or body drenchers should be provided in any lab using chemicals.
 - Showers should be tested every 6 months.
9. Avoid the use of contact lenses in the laboratory.
 - If contact lenses must be worn, the science teacher must be informed so indirectly vented goggles may be worn.
10. Place a work order with maintenance to repair any deficiency.

II. **CHEMICALS** (29CFR1910.1450 Appendix A(D))

A. **CHEMICAL PURCHASING/PROCUREMENT PROCEDURES –**

1. Establish a chemical procurement plan for your building.
2. Before a chemical is procured, proper handling, storage, and disposal methods must be known to those responsible.
3. Institute a centralized purchasing program in which one person, who is knowledgeable of all the chemicals on hand, does all the purchasing, or links purchasing requests into an inventory tracking system so that excess chemicals in stock can be used before buying more.
 - All chemicals will be received by the Chemical Hygiene Officer.
 - Choose one of the following options:
 - ~ The school will not accept donations of chemicals from outside sources
 - OR
 - ~ The school will not accept donations of chemicals from outside sources without review by the CHO to insure that the material is
 - a. needed by the school
 - b. useful to the school as donated
 - c. a quantity no greater than a two-year supply
 - d. is not a hazardous waste at the donating organization
4. The school will follow Idaho Code Title 39, Health and Safety, Chapter 44, Hazardous Waste Management, Sections 4405, 4407, 4408, and 4410 for applicable exclusions and procedures for transfer.
5. Any concerns about the safety of a requested chemical should be brought to the attention of the Chemical Hygiene Officer or Administrator.

B. **BEFORE ORDERING CHEMICALS -**

1. Ensure the chemical you are going to purchase is not on the Category 4 or 5 lists.

2. Purchase Category 4 chemicals IAW district policy (AP only, 1 year supply only)
3. Assess all the hazards and physical properties of the chemical using the MSDS; evaluate both short and long-term risks.
4. Consider the worst case scenario(s) in the event that the substance is mismanaged, spilled, or causes personal injury.
5. Make sure the hazardous properties of the chemical do not exceed the educational utility of the experiment.
6. Determine whether a safer, less hazardous chemical can be used (refer to section titled, "What are Some Strategies to Reduce the Amount and/or Toxicity of Chemical Waste Generated in the Laboratory?").
7. Determine whether the appropriate facilities are available for the proper storage of the chemical and the ventilation is sufficient.
8. Determine whether the proper personal protective equipment and safety equipment is on hand for using the chemical.
9. Establish whether the chemical or its end product will require disposal as a hazardous waste.
10. Ensure that the budget will allow for the appropriate and legal disposal of the chemical and/or its end product.
11. Have a mechanism in place to dispose of the chemical and its end product legally and safely.
12. Determine whether lesser amounts of a chemical can be used to conduct the experiment (refer to section titled, "What are Some Strategies to Reduce the Amount and/or Toxicity of Chemical Waste Generated in the Laboratory?").
13. Purchase/order the minimum quantities that are consistent with the rate of use.
 - Order only what will be used within two school years or less.
 - If possible, order reagents in polyethylene bottles or plastic coated glass bottles to minimize breakage, corrosion, and rust.
14. Whenever practical, chemicals should be purchased as pre-diluted solutions to minimize mixing and the chance for improper labeling and storage.
15. No container will be accepted without an adequate label and material safety data sheet.

C. MATERIAL SAFETY DATA SHEETS (MSDS) –

Whenever you buy a chemical from a science supply company, that company is required by law to include a sheet of paper with every chemical included in the shipment that is called a Material Safety Data Sheet.

1. You must have a MSDS on file for every chemical stored and/or used in your school.
 - A chemical is defined as anything that is used in an experiment (i.e. vinegar, sugar, etc.).
 - The MSDS must be kept in a central location that is known of by, and assessable to all employees, teachers, administrators, and custodial staff.
2. If you purchase a chemical from a grocery store, you can go online to <http://www.msdsonline.com> to get a printout of the MSDS sheet.
3. Material Safety Data Sheets (MSDS) contains information regarding the proper procedures for handling, storing, and disposing of chemical substances.
 - An MSDS accompanies all chemicals or kits that contain chemicals.

- If an MSDS does not accompany a chemical, go to www.msdsonline.com or http://www.flinnsci.com/search_MSDS.asp.
- Save all MSDSs and store in a designated file or binder using a system that is organized and easy to understand.
- Place the MSDS collection in a central, easily accessible location known to all workers and emergency personnel.

4. UNDERSTANDING AN MSDS –

- Section 1
 - ~ gives details on what the chemical or substance is, CAS number, synonyms, the name of the company issuing the data sheet, and often an emergency contact number
- Section 2
 - ~ identifies the OSHA hazardous ingredients, and may include other key ingredients and exposure limits
- Section 3
 - ~ lists the major health effects associated with the chemical
 - ~ sometimes both the acute and chronic hazards are given
- Section 4
 - ~ provides first aid measures that should be initiated in case of exposure
- Section 5
 - ~ presents the fire-fighting measures to be taken
- Section 6
 - ~ details the procedures to be taken in case of an accidental release
 - ~ the instructions given may not be sufficiently comprehensive in all cases, and local rules and procedures should be utilized to supplement the information given in the MSDS sheet
- Section 7
 - ~ addresses the storage and handling information for the chemical
 - ~ this is an important section as it contains information on the flammability, explosive risk, propensity to form peroxides, and chemical incompatibility for the substance
 - ~ it also addresses any special storage requirements for the chemical (i.e., special cabinets or refrigerators)
- Section 8
 - ~ outlines the regulatory limits for exposure, usually the maximum permissible exposure limits (PEL) (refer to Appendix G)
 - ~ the PEL, issued by the Occupational Safety and Health Administration, tells the concentration of air contamination a person can be exposed to for 8-hours a day, 40-hours per week over a working lifetime (30-years) without suffering adverse health effects
 - ~ it also provides information on personal protective equipment
- Section 9
 - ~ gives the physical and chemical properties of the chemical
 - ~ information such as the evaporation rate, specific gravity, and flash points are given

- Section 10
 - ~ gives the stability and reactivity of the chemical with information about chemical incompatibilities and conditions to avoid
- Section 11
 - ~ provides both the acute and chronic toxicity of the chemical and any health effects that may be attributed to the chemical
- Section 12
 - ~ identifies both the ecotoxicity and the environmental fate of the chemical
- Section 13
 - ~ offers suggestions for the disposal of the chemical. Local, state, and Federal regulations should be followed
- Section 14
 - ~ gives the transportation information required by the Department of Transportation
 - ~ this often identifies the dangers associated with the chemical, such as flammability, toxicity, radioactivity, and reactivity
- Section 15
 - ~ outlines the regulatory information for the chemical. The hazard codes for the chemical are given along with principle hazards associated with the chemical. A variety of country and/or state specific details may be given
- Section 16
 - ~ provides additional information such as the label warnings, preparation and revision dates, name of the person or firm that prepared the MSDS, disclaimers, and references used to prepare the MSDS

D. CHEMICAL TRACKING –

- A chemical tracking system is a database of chemicals in the laboratory.
 - ~ A "cradle-to-grave" chemical tracking system should track chemicals from the time they are purchased through the time they are used and discarded
 - ~ A good chemical tracking system can reduce procurement costs, eliminate unnecessary purchases, and minimize disposal expenses
 - ~ A tracking system can be set up by (1) using index cards or another paper system organized by chemical name and/or molecular formula or (2) by creating a computer-based system
- The following tracking fields are recommended:
 - ~ Chemical name as printed on the container
 - ~ Chemical name as it appears on the MSDS if different from that on the container Molecular formula
 - ~ Chemical Abstract Service (CAS) registry number Date received
 - ~ Source (i.e., chemical manufacturer, and if known, supplier)
 - ~ Type of container
 - ~ Hazard classification (for storage, handling, and disposal)
 - ~ Required storage conditions
 - ~ Room number
 - ~ Location within the room (i.e., shelf #1, acid cabinet)
 - ~ Expiration or "use by" date
 - ~ Amount of the chemical in the container
 - ~ Name of the person who ordered or requested the chemical

- Each record represents a SINGLE CONTAINER of a chemical (rather than just the chemical itself).
- Keep accurate, up-to-date records of the use of each chemical in the system.
- Conduct regularly scheduled inventory inspections to purge any inaccurate data in the system and dispose of outdated, unneeded, or deteriorated chemicals IAW this Chemical Hygiene Plan.

E. LABELING CHEMICAL CONTAINERS –

- No unlabeled substance should be present in the laboratory at any time!
- Labeling Basics
 - ~ Use labels with good adhesive
 - ~ Use a permanent marker (waterproof and fade resistant) or laser (not inkjet) printer. Print clearly and visibly
 - ~ Replace damaged, faded or semi-attached labels
- Commercially Packaged Chemicals
 - ~ Verify that the label contains the following information:
 - a. Chemical name (as it appears on the MSDS)
 - b. Name of chemical manufacturer
 - c. Necessary handling and hazard information
 - d. Date received
 - e. Date first opened
 - f. Expiration or “use by” date (if one is not present)
- Secondary Containers and Prepared Solutions
 - ~ When one transfers a material from the original manufacturer’s container to other vessels, these vessels are referred to as “secondary containers”
 - ~ Label all containers used for storage with the following:
 - a. Chemical name (as it appears on the MSDS)
 - b. Name of the chemical manufacturer or person who prepared the solution
 - c. Necessary handling and hazard information
 - d. Concentration or purity
 - e. Date prepared
 - f. Expiration or “use by” date
- Containers in Immediate Use
 - ~ These chemicals are to be used within a laboratory session. Label all containers in immediate use with the following:
 - a. Chemical name (as it appears on the MSDS)
 - b. Necessary handling and hazard information
- Chemical Waste
 - ~ All containers used for chemical waste should be labeled with:
 - a. “WASTE” or “HAZARDOUS WASTE”
 - b. Chemical name (as it appears on the MSDS)
 - c. Accumulation start date
 - d. Hazard(s) associated with the chemical waste
- Peroxide-Forming Substance
 - ~ Peroxide-forming chemical must be labeled with:
 - a. Date received
 - b. Date first opened
 - c. Date to be disposed of

F. MAINTENANCE OF CHEMICALS -

1. Maintain a complete inventory of chemicals in the chemical storage room.
 - Inventory and Update the chemical inventory annually.
 - File the annual inventory with the **Mountain Home Fire Department** and Emergency Responder.
 - Provide a copy of the chemical inventory to the building point of contact to update Rapid Responder
2. Perform regular inspections of chemicals.
 - Chemical containers should be periodically checked for rust, corrosion, and leakage.
 - Mark the acquisition dates on all peroxide forming chemicals, and test them for peroxides or dispose of them after six months.
 - Make sure all chemicals and reagents are labeled.
 - Chemical labels must be readable and free from chemical encrustation.
 - Chemical labels should state name of chemical, be firmly attached to the container, list hazards, and name responsible party (manufacturer).
3. Use explosion-proof or explosion safe refrigerators only.
 - Standard refrigerators that have not been converted should never be used to store flammable chemicals; a spark from a light bulb may ignite flammable vapors.
 - Do not store food in the refrigerator.
4. Do not store food and drink with any chemicals.
5. If possible, keep all chemicals in their original containers.
6. Do not store chemicals on the lab bench, on the floor, or in the laboratory chemical hood.
7. Maintain a clear access to and from the storage areas.
 - Where possible, two separate exits shall be provided in chemical storage areas.
8. Highly toxic chemicals (LD 50 50 mg/kg) whose containers have been opened will be stored in secondary containers.
9. Ensure chemicals not in use are stored in a locked facility with limited access.
10. Know the storage, handling, and disposal requirements for each chemical used.
11. Any chemicals identified during the inventory as expired, outdated, unlabeled, unknown, or unwanted must be listed for disposal.
 - See Waste Disposal section
12. Make certain chemicals are disposed of properly. Consult the label and the Material Safety Data Sheet for disposal information and always follow appropriate chemical disposal regulations.
13. Provide spill cleanup supplies (absorbents, neutralizers) in any room used for chemical storage or use.

G. HAZARDOUS MATERIAL HANDLING AND STORAGE -

Follow all federal, state and local regulations for material handling and storage and waste disposal.

1. First, identify any specific requirements regarding the storage of chemicals from (1) local, State, and Federal regulations and (2) insurance carriers.
2. When opening newly received chemicals, immediately read the warning label to be aware of any special storage precautions like refrigeration or inert atmosphere storage.

3. Chemicals should be dated upon receipt, dated to be disposed where appropriate, and dated when opened (e.g., peroxides, anhydrous ethers, sodium nitrites, etc.).
4. Chemical labels should state name of chemical, be firmly attached to the container, list hazards, and name responsible party (manufacturer).
5. General Rules for Chemical Storage -
 - All chemicals in the stockroom should be stored according to chemical compatibility.
 - ~ Organize chemicals first by COMPATIBILITY - not alphabetic succession
 - a. Chemicals will be segregated by hazard classification and compatibility in a well-identified area with local exhaust ventilation.
 - b. Exhaust air from the stockroom should be ducted directly to the outside.
 - c. Ventilate storage areas adequately.
 - d. Store alphabetically within compatible groups.
 - e. Refer to section titled Suggested Shelf Storage Pattern
 - ~ Do not store chemicals on the floor (except gas cylinders) or above eye level.
 - ~ Storage of chemicals is not allowed at the lab bench or areas outside the designated chemical storage room, such as in aisles, stairwells or hallways or on desks or floors.
 - Ensure that all storage areas have doors with locks.
 - Store chemicals inside a closeable cabinet or on a sturdy shelf with a front-edge lip to prevent accidents and chemical spills; a ¾-inch front edge lip is recommended.
 - ~ Use appropriate shelving or cabinets.
 - ~ If metal clips are used to hold shelves, they should be inspected for corrosion and replaced as necessary.
 - ~ Make sure shelves holding containers are secure.
 - ~ Attach anti-roll lips on shelves to prevent chemicals from falling.
 - ~ Secure shelving to the wall or floor
 - Restrict access to chemical storage areas through signage and secure locks.
 - ~ No student or unauthorized faculty should be allowed in storage area unsupervised.
 - ~ Keep chemical storage areas off limits to all students.
 - Store flammable liquids in approved fire cabinets.
 - ~ Where possible, vent flammable cabinets to the outdoors.
 - ~ If not possible to vent to the outdoors, do not vent the cabinet at all (leave the bungs on place).
 - Gas cylinders should be properly secured, segregated according to compatibility, and stored upright and away from heat sources.
6. General Rules for Storage Don'ts -
 - Do not place heavy materials, liquid chemicals, and large containers on high shelves
 - Do not store chemicals on tops of cabinets.
 - Do not store chemicals on the floor, even temporarily.
 - Do not store items on bench tops and in laboratory chemical hoods, except when in use.
 - Do not store chemicals on shelves above eye level.
 - Do not store chemicals with food and drink.
 - Do not store chemicals in personal staff refrigerators, even temporarily.

- Do not expose stored chemicals to direct heat or sunlight, or highly variable temperatures.
7. Chemical Segregation
 - Store acids in a dedicated acid cabinet
 - ~ Nitric acid should be stored alone unless the cabinet provides a separate compartment for nitric acid storage.
 - Store highly toxic chemicals in a dedicated, lockable poison cabinet that has been labeled with a highly visible sign.
 - Store volatile and odoriferous chemicals in a ventilated cabinet.
 - Store flammables in an approved flammable liquid storage cabinet.
 - Store water sensitive chemicals in a water-tight cabinet in a cool and dry location segregated from all other chemicals in the laboratory.
 8. Proper Use of Chemical Storage Containers
 - Never use food containers for chemical storage.
 - Make sure all containers are properly closed.
 - After each use, carefully wipe down the outside of the container with a paper towel before returning it to the storage area. Properly dispose of the paper towel after use.

H. SUGGESTED SHELF STORAGE PATTERN -

1. A suggested arrangement of compatible chemical families on shelves in a chemical storage room, suggested by the Flinn Chemical Catalog/Reference Manual, is depicted.
 - However, the list of chemicals below does not mean that these chemicals should be used in a school laboratory (See Cat 4 and 5 Chemical list).
 - First sort chemicals into organic and inorganic classes.
 - Next, separate into the following compatible families.

Inorganics	Organics
1. Metals, Hydrides	1. Acids, Anhydrides, Peracids
2. Halides, Halogens, Phosphates, Sulfates, Sulfites, Thiosulfates	2. Alcohols, Amides, Amines, Glycols, Imides, Imines
3. Amides, Azides*, Nitrates* (except Ammonium nitrate), Nitrites*, Nitric acid	3. Aldehydes, Esters, Hydrocarbons
4. Carbon, Carbonates, Hydroxides, Oxides, Silicates	4. Ethers*, Ethylene oxide, Halogenated hydrocarbons, Ketenes, Ketones
5. Carbides, Nitrides, Phosphides, Selenides, Sulfides	5. Epoxy compounds, Isocyanates
6. Chlorates, Chlorites, Hydrogen Peroxide*, Hypochlorites, Perchlorates*, Perchloric acid*, Peroxides	6. Azides*, Hydroperoxides, Peroxides
7. Arsenates, Cyanates, Cyanides	7. Nitriles, Polysulfides, Sulfides, Sulfoxides

8. Borates, Chromates, Manganates, Permanganates	8. Cresols, Phenols
9. Acids (except Nitric acid)	
10. Arsenic, Phosphorous*, Phosphorous Pentoxide*, Sulfur	

**Chemicals deserving special attention because of their potential instability.*

2. SUGGESTED SHELF STORAGE PATTERN FOR INORGANICS -

- **ACID STORAGE CABINET ACID INORGANIC #9**

- ~ Acids, EXCEPT Nitric acid
- ~ Store Nitric acid away from other acids unless the cabinet provides a separate compartment for nitric acid storage.

Inorganic #10 Arsenic, Phosphorous, Phosphorous Pentoxide, Sulfur	Inorganic #7 Arsenates, Cyanates, Cyanides STORE AWAY FROM WATER
Inorganic #2 Halides, Halogens, Phosphates, Sulfates, Sulfites, Thiosulfates	Inorganic #5 Carbides, Nitrides, Phosphides, Selenides, Sulfides
Inorganic #3 Amides, Azides, Nitrates, Nitrites EXCEPT Ammonium nitrate STORE AMMONIUM NITRATE AWAY FROM ALL OTHER SUBSTANCES	Inorganic #8 Borates, Chromates, Manganates, Permanganates
Inorganic #1 Hydrides, Metals STORE AWAY FROM WATER. STORE ANY FLAMMABLE SOLIDS IN DEDICATED CABINET	Inorganic #6 Chlorates, Chlorites, Hypochlorites, Hydrogen Peroxide, Perchlorates, Perchloric acid, Peroxides
Inorganic #4 Carbon, Carbonates, Hydroxides, Oxides, Silicates	Miscellaneous

Do not store chemicals on the floor

3. SUGGESTED SHELF STORAGE PATTERN FOR ORGANICS -

Organic #2 Alcohols, Amides, Amines, Imides, Imines, Glycols STORE FLAMMABLES IN A DEDICATED CABINET	Organic #8 Cresols, Phenol
Organic #3 Aldehydes, esters, hydrocarbons STORE FLAMMABLES IN A DEDICATED CABINE	Organic #6 Azides, Hydroperoxides, Peroxides
Organic #4 Ethers, Ethylene oxide, Halogenated Hydrocarbons, Ketenes, Ketones STORE FLAMMABLES IN A DEDICATED CABINET	Organic #1 Acids, Anhydrides, Peracids STORE CERTAIN ORGANIC ACIDS IN ACID CABINET
Organic #5 Epoxy compounds, Isocyanates	Miscellaneous
Organic #7 Nitriles, Polysulfides, Sulfides, Sulfoxides, etc.	Miscellaneous

Do Not store chemicals on the floor

4. POISON STORAGE CABINET -

POISON STORAGE CABINET Toxic substances
FLAMMABLE STORAGE CABINET FLAMMABLE ORGANIC #2 Alcohols, Glycols, etc.
FLAMMABLE ORGANIC #3 Hydrocarbons, Esters, etc.
FLAMMABLE ORGANIC #4

I. COMPRESSED GAS CYLINDERS - STORED, MAINTAINED, AND HANDLED

Compressed gases can be hazardous because each cylinder contains large amounts of energy and may also have high flammability and toxicity potential.

- The following is a list of guidelines for storage, maintenance, and handling of compressed gas cylinders:
 - Make sure the contents of the compressed gas cylinder are clearly stenciled or stamped on the cylinder or on a durable label.
 - Do not identify a gas cylinder by the manufacturer's color code.

- Never use cylinders with missing or unreadable labels.
- Check all cylinders for damage before use.
- Be familiar with the properties and hazards of the gas in the cylinder before using.
- Wear appropriate protective eyewear when handling or using compressed gases.
- Use the proper regulator for each gas cylinder.
- Do not tamper with or attempt to repair a gas cylinder regulator.
- Never lubricate, modify, or force cylinder valves.
- Open valves slowly using only wrenches or tools provided by the cylinder supplier directing the cylinder opening away from people.
- Check for leaks around the valve and handle using a soap solution, "snoop" liquid, or an electronic leak detector.
- Close valves and relieve pressure on cylinder regulators when cylinders are not in use. Label empty cylinders "EMPTY" or "MT" and date the tag; treat in the same manner that you would if it were full.
- Always attach valve safety caps when storing or moving cylinders.
- Transport cylinders with an approved cart with a safety chain; never move or roll gas cylinders by hand.
- Securely attach all gas cylinders (empty or full) to a wall or laboratory bench with a clamp or chain, or secure in a metal base in an upright position.
- Store cylinders by gas type, separating oxidizing gases from flammable gases by either 20 feet or a 30-minute firewall that is 5 feet high.
- Store gas cylinders in cool, dry, well-ventilated areas away from incompatible materials and ignition sources.
- Do not subject any part of a cylinder to a temperature higher than 125 °F or below 50 °F.
- Store empty cylinders separately from full cylinders.

J. STRATEGIES TO REDUCE THE AMOUNT AND/OR TOXICITY OF CHEMICAL WASTE GENERATED IN THE LABORATORY -

1. All laboratories that use chemicals inevitably produce chemical waste that must be properly disposed of. It is crucial to minimize both the toxicity and the amount of chemical waste that is generated.
 - Waste will be disposed of annually
2. Several things that can be done to minimize hazards, waste generation, and control costs:
 - Purchase chemicals in the smallest quantity needed.
 - Use safer chemical substitutes/alternatives such as chemicals which have been determined to be less harmful or toxic (Table 1 contains examples).
 - Use microscale experiments.
 - Chemical experiments using smaller quantities of chemicals Recycle chemicals by performing cyclic experiments where one product of a reaction becomes the starting material of the following experiment.
 - Consider detoxification or waste neutralization steps.
 - Use demonstration videos in lieu of experiments that generate large amounts of chemical waste.
 - Use pre-weighed or premeasured chemical packets such as chem.-capsules that reduce bulk chemical disposal problems (no excess chemicals remain).

- For information about the EPA's Green Chemistry Program, which promotes the use of innovative technologies to reduce or eliminate the use or generation of hazardous substances, visit:

- www.epa.gov/greenchemistry/
- <https://www.acs.org/content/acs/en/greenchemistry.html>

Toxic chemicals/equipment	Possible substitution(s)
Mercury thermometers	Digital and alcohol thermometers
Mercury barometer	Aneroid or digital pressure sensors
Methyl orange or methyl red	Bromophenol blue, bromothymol blue
Lead chromate	Copper carbonate
p-Dichlorobenzene	Lauric acid
Dichromate/sulfuric acid mixture	Ordinary detergents, enzymatic cleaners
Alcoholic potassium hydroxide	Ordinary detergents, enzymatic cleaners

III. **WASTE DISPOSAL** (29 CFR 1910.1450 (Appendix A (D)(11))

Goal: To assure that minimal harm to people, other organisms, and the environment will result from the disposal, of waste laboratory chemicals.

Any chemical discarded or intended to be discarded is chemical waste.

HAZARDOUS chemical waste as designated by the Environmental Protection Agency (EPA) or State authority is waste that presents a danger to human health and/or the environment.

Environmental regulations also govern chemical waste disposal. Go to <https://www.deq.idaho.gov/> and <https://www.epa.gov/sites/production/files/2015-10/documents/workbk.pdf> and <https://www.epa.gov/sites/production/files/2015-10/documents/workbk.pdf> and <https://www.deq.idaho.gov/pollution-prevention/p2-for-schools/chemical-roundup-program/>

A. **PROCEDURE FOR CHEMICAL DISPOSAL -**

- Prior to the start of each semester, the CHO will complete an inventory of stored chemical wastes (including virgin chemical stock identified as waste).
- The CHO will coordinate hazardous waste disposal.
- It is highly recommended to use a logbook containing a detailed list of materials/containers.
- Indiscriminate disposal by pouring waste down the drain or adding them to the general trash is unacceptable.
 - It is not permissible to neutralize quantities of >500 milliliters of corrosive hazardous waste or evaporate, distill, filter, or burn other waste chemicals.
- If large quantities of hazardous chemical wastes are being stored or if a container is full, a hazardous waste pick-up should be scheduled by the CHO within 180-days of the container becoming full.
- The CHO is responsible for all hazardous waste manifests and associated paperwork.

7. No waste pick-ups will be scheduled during regular school hours.
8. All chemical wastes destined for hazardous waste disposal must be stored in the designated, signed hazardous waste storage area.
 - Stored in an appropriate DOT approved shipping container(s)
 - Segregated for compatibility
 - All containers must have the following information on the label:
 - ~ “Hazardous Waste”
 - ~ The chemical contents
 - ~ The date that waste was first put in
 - ~ The date the container was filled.
 - Attach waste disposal plan
9. According to EPA regulations, there are four characteristics that define a waste as hazardous:
 - Ignitability
 - Corrosivity
 - Reactivity
 - Toxicity
10. When a hazardous waste pick-up is needed, this school will contact the following company to transport and dispose of hazardous waste:
 - | | |
|--|----------------|
| | Safety Kleen |
| | (company name) |
 - | | |
|--|----------------|
| | 208-382-8882 |
| | (phone number) |

B. STORING CHEMICAL WASTE -

1. Store all waste in containers that are in good condition and are compatible with their contents.
2. Clearly and permanently label each container as to its contents and label as hazardous waste
3. Store waste in a designated area away from normal laboratory operations
 - Prevent unauthorized access.
4. Store waste bottles away from sinks and floor drains.
5. Do not completely fill waste bottles; leave several inches of space at the top of each waste container.
 - Cap all waste bottles

C. DISPOSAL OF CHEMICAL WASTE -

The EPA has written a comprehensive set of regulations that govern the management of hazardous waste from the point of generation to ultimate disposal (<https://www.epa.gov/sites/production/files/2015-10/documents/workbk.pdf> <https://www.deq.idaho.gov/pollution-prevention/p2-for-schools/chemical-roundup-program/>).

- Review it if you have any question as to whether your waste is hazardous.
1. Generators of hazardous waste (that would be us) are responsible for ensuring proper disposal of their hazardous waste and can incur liability for improper disposal of their hazardous waste.

2. Disposal Procedure -

- Do not pour chemicals down the drain (unless authorized by local sewer authority).
- Do not treat hazardous waste on-site.
- During the annual chemical disposal, we will use professional, licensed, hazardous waste haulers/transporters that will ensure appropriate disposal.
 - ~ In March of each year, the CHO will notify the secondary school Science Department Chairs of the Annual Chemical Disposal.
 - ~ Department Chairs will compile a list of materials to be disposed of and forward it to the CHO
 - ~ The CHO will contract with a waste disposal agency and set a date for the chemical pick up.
 - ~ Department chairs will be notified of the pickup date.
 - ~ The CHO will send the Superintendent the list of chemicals inventoried and disposed of, including the date of the inventory and the date of the disposal.

D. SUBSTANCES WITH GREATER HAZARDOUS NATURE THAN EDUCATIONAL UTILITY -

1. Chemicals used in the laboratory may be hazardous because of the following:
 - Safety risks (i.e., highly flammable or explosive material)
 - Acute and chronic health hazards
 - Environmental harm
 - Impairment of indoor air quality
2. Assessment of the chemicals in this list indicates that their hazardous nature is greater than their potential usefulness in many school programs. Evaluation included physical hazards (i.e., flammability, explosive propensity, reactivity, corrosivity) and health hazards (i.e., toxicity, carcinogenicity).
3. This following list of chemicals was generated from the Manual of Safety and Health Hazards in the School Science Laboratory published by U.S. Department of Health and Human Services, and National Institute for Occupational Safety and Health [1984].
4. Category 5 Chemicals - Very High Risk
 - Chemicals that will not be purchased, stored, or used in MHSD #193 science labs.

Acetal	Acetaldehyde	Acetyl Chloride
Acrolein	Acrylamide	Acrylic Acid
Acrylonitrile	Adrenaline	Adrenaline Chloride Solution
Alkaline Iodide Azide	Allyl Chloride	Aluminum Chloride – Anhydrous
Aminodiphenyl, 4-	Ammonium Bifluoride	Ammonium Metavanadate
Ammonium Nitrite	Ammonium Perchlorate	Ammonium Polysulfide
Ammonium Sulfide	Anasol	Anhydrous Ammonia
Aniline	Aniline Acetate	Aniline Hydrochloride
Anthracene	Antimony – Powder	Antimony Trichloride
Arsenic – Metal Lump	Arsenic – Powder	Arsenic Trioxide
Arsine	Asbestos	Barium – Metal Lump
Barium – Powder	Barium Chromate	Benzalkonium Chloride
Benzene	Benzidine	Benzoyl Chloride

Benzoyl Peroxide	Beryllium Hydroxide	Beryllium – Powder
Beryllium Oxide	Beryllium Sulfate	Boron Trichloride
Bouin’s Fixative	Butadiene	Cadmium – Powder
Cadmium Chloride – Anhydrous	Cadmium Chloride - Pentahydrate	Cadmium Nitrate - Anhydrous
Cadmium Nitrate - Tetrahydrate	Cadmium Oxide	Cadmium Sulfate – Anydrous
Cadmium Sulfate – Octahydrate	Calcium - Powder	Calcium Cyanide
Carbon Disulfide	Carbon Monoxide	Carbon Tetrachloride
Carbonyl Sulfide	Carnoy’s Fixative	Catechol
Chloral Hydrate	Chloretone	Chlorine Trifluoride
Chloroethanol	Chloroform	Chlorophenol
Chloroprene	Chloropromazine	Chlorosulfonic Acid
Cobalt - Powder	Colchicine	Collodion
Cresol	Cumene	Cupric Cyanide
Cuprous Cyanide	Cyanogen Bromide	Dichlorobenzidine
Dichlorophenoxy Acetic Acid	Dimethyl Aniline	Dimethylaminoazobenzene, 4-
Dinitrophenol	Dinitrophenyl Hydrazine	Dioxane
Estrone	Ethyl Chloride	Ethyl Ether
Ethyl Iodide	Ethyl Nitrate	Ethylene Oxide
Ethylenediamine	Ethyleneimine	Formaldehyde
Gilson’s Fixative	Hayem Diluting Fluid	Hexane/Acetone Aerosol Sprays
Hydrazine	Hydrazine Sulfate	Hydrofluoric Acid
Hydrogen Bromide	Hydrogen Chloride	Hydrogen Peroxide (>31%)
Hydrogen Sulfide Gas	Immersion Oil – Containing PCBs	Isopropyl Ether
Lauroyl Peroxide	Lead – Powder	Lead Arsenate
Lead Chromate	Lithium – Powder	Manganese – Powder
Mercaptoethanol	Mercuric Bichloride	Mercuric Chloride
Mercuric Iodide	Mercuric Nitrate monohydrate	Mercuric Sulfate
Mercurochrome	Mercurous Chloride	Mercurous Nitrate
Mercurous Nitrate (mercury (I) nitrate)	Mercurous Sulfate	Mercury – Elemental
Mercury Oxide	Mercury Sulfide	Mercury Thermometers
Methoxyethanol	Methyl Bromide	Methyl Chloromethyl Ether
Methyl Iodide	Methyl Isobutyl Ketone	Methyl Isocyanate
Methyl Mercaptan	Methyl Tert-Butyl Ether	Methylamine
Millon’s Reagent	Naphthylamine	Nessler’s Reagent
Nicotine	Nitrobenzene	Nitroglycerin
Nitrosodimethylamine, N-	Osmium Tetroxide	Paraldehyde
Paris Green	Pentachlorophenol	Perchloric Acid
Phenylarsine Oxide – Solid	Phenylthiocarbamide	Phosphorus – Red
Phosphorus – White	Phosphorus – Yellow	Phosphorus Pentasulfide
Phosphorus Pentoxide	Phosphorus Trichloride	Physostigmine

Picric Acid	Potassium – Chunks	Potassium Cyanide
Potassium Peroxide	Pyridine	Selenium – Metal Lump
Selenium – Powder	Silicon Tetrafluoride	Silver Cyanide
Sodium – Chunks	Sodium Arsenate	Sodium Arsenite
Sodium Azide	Sodium Borohydride	Sodium Cyanide
Sodium Dithionite	Sodium Fluoroacetate	Sodium Nitroferricyanide
Strychnine	Sulfur Dioxide	Testosterone
Testosterone Proprionate	Tetrabromoethane	Tetrafluoroethylene
Tetrahydrofuran	Thallium	Thimerosol
Thionyl Chloride	Thorium Nitrate	Titanium Tetrachloride
Titanium Trichloride	Tollen’s Reagent	Trichloroethane
Trichloroethylene	Trichlorotrifluoroethane	Triethyl Phosphate
Trinitrobenzene	Trinitrotoluene	Uranium
Uranyl Acetate	Uranyl Nitrate	Vanadium Pentoxide
Vinyl Chloride	Vinyl Ether	Zenker’s Fixative

E. SUBSTANCES WITH A HAZARDOUS NATURE, BUT MAY HAVE POTENTIAL EDUCATIONAL UTILITY -

1. These are appropriate for advanced-level High School classes only.
2. This following list was generated from the Manual of Safety and Health Hazards in the School Science Laboratory published by U.S. Department of Health and Human Services and National Institute for Occupational Safety and Health [1984].
 - Carcinogenic substances were identified from the Report on Carcinogens (10th Edition) generated by the National Toxicology Program (2002).
3. **CATEGORY 4 CHEMICALS - HIGH RISK**
 - Chemicals that will only be used as required for AP Chemistry classes.
 - They will only be bought and stored in quantities required for annual use.
 - These chemicals will not be purchased for or used in our middle schools.

Acetic Anhydride	Acetonitrile	Ammonium Dichromate
Ammonium Fluoride	Barium Peroxide	Benzonitrile
Beryllium – Metal Lump	Bismuth – Powder	Bromine
Bromine Water	Bromobenzene	Bromobutane
Bromoform	Butyraldehyde	Cadmium – Metal Lump
Calcium Sulfide	Camphor	Chlorine
Chromic Acid	Chromium – Powder	Chromium Trioxide
Cyclohexene	Dibromo-3-chloropropane, 1,2-	Dibutyl Phthalate
Dichloroethane	Diethylamine	Dimethyl Sulfoxide
Ethidium Bromide	Ethoxyethanol	Formalin
Formamide	Furfural	Glutaraldehyde (<4%)
Glutaraldehyde (>4%)	Guaiaicol	Gunpowder
Hexachlorophene	Hydriodic Acid	Hydrogen
Hydrogen Sulfide Water	Hydroxylamine Hydrochloride	Iron Sulfide
Isolvaleric Acid	Lead Acetate – Dibasic	Lead Acetate – Monobasic
Lead Bromide	Lead Carbonate	Lead Carbonate – Basic

Lead Chloride	Lead Diiodide	Lead Dioxide
Lead Iodide	Lead Oxide	Lead Sulfate
Lead Sulfide	Lead Tetroxide	Lithium Aluminum Hydride
Lithium Carbonate	Magnesium – Powder	Magnesium Perchlorate
Methyl Ethyl Ketone	Methyl Isopropyl Ketone	Methyl Methacrylate
Methylene Chloride	Molybdenum – Powder	Naphthol, 1-
Naphthol, 2-	Nickel – Powder	Nitrilotriacetic Acid
Nitrogen Triiodide	Nitrophenol, 3-	Nitrophenol, 4-
Octyl Phenol	Oxalic Acid – Anhydrous	Para-dichlorobenzene
Paraformaldehyde	Pentane	Perchloroethylene
Phenol	Phenylarsine Oxide – Solution	Phenylhydrazine Hydrochloride
Phosphomolybdic Acid	Potassium – 0.5 gram Chips	Potassium Chromate
Potassium Fluoride	Potassium Perchlorate	Propiolactone, b-
Silver Chloride	Silver Oxide	Sodium Bifluoride
Sodium Chromate – Anhydrous	Sodium Chromate – Tetrahydrate	Sodium Cobaltinitrite
Sodium Dichromate – Anhydrous	Sodium Dichromate – Dihydrate	Sodium Ferricyanide
Sodium Ferrocyanide	Sodium Fluoride	Sodium Perchlorate
Sodium Peroxide	Sodium Sulfide	Strontium
Sudan Yellow	Sulfur Hexafluoride	Sulfurated Potash
Thioacetamide	Thiourea	Toluene
Toluidine, o-	Triethanolamine	Triethylamine
Trimethylamine	Wood’s Metal	Xylene
Yttrium Oxide		

F. INCOMPATIBLE CHEMICALS -

1. This list represents the commonly used laboratory chemicals and their incompatibilities with other chemicals.
2. This list was generated from the Hazards in the Chemical Laboratory, 4th Edition, Safety in Academic CL. Bretherick, Ed. [1986]; reproduced by permission of the Royal Society of Chemistry.
 - It is by no means complete; however, it can be used as a guide for proper storage and use in the laboratory.
 - Specific incompatibilities are also listed in the material safety data sheets.

Chemical	Incompatible with
Acetic acid	Chromic acid, Nitric acid, Peroxides, Permanganates
Acetic anhydride	Hydroxyl group containing compounds, Ethylene glycol, Perchloric acid
Acetone	Concentrated Nitric and Sulfuric acid mixtures, Hydrogen peroxide
Acetylene	Bromine, Chlorine, Copper, Fluorine, Mercury, Silver

Ammonium nitrate	Acids, Chlorates, Flammable liquids, Nitrates, powdered metals, Sulphur, finely divided organic or combustible materials
Aniline	Hydrogen peroxide, Nitric acid
Calcium oxide	Water
Carbon, activated	Calcium hypochlorite, other oxidants
Chlorates	Acids, Ammonium salts, Metal powders, Sulphur, finely divided organic or combustible materials
Chromic acid	Acetic acid, Camphor, Glycerol, Naphthalene, Turpentine, other flammable liquids
Chlorine	Acetylene, Ammonia, Benzene, Butadiene, Butane and other petroleum gases, Hydrogen, Sodium carbide, Turpentine, finely divided metals
Copper	Acetylene, Hydrogen peroxide
Hydrazine	Hydrogen peroxide, Nitric acid, other oxidants
Hydrocarbons	Bromine, Chlorine, Chromic acid, Fluorine, peroxides
Hydrocyanic acid	Alkalis, Nitric acid
Hydrofluoric acid, anhydrous	Ammonia (aqueous or anhydrous)
Hydrogen peroxide	Aniline, Chromium, combustible materials, Copper, Iron, most metals and their salts, Nitromethane, any flammable liquid
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Iodine	Acetylene, Ammonia (aqueous or anhydrous)
Mercury	Acetylene, Ammonia, Fulminic acid
Nitric acid, concentrated	Acetic acid, Acetone, Alcohol, Aniline, Chromic acid, flammable gases, flammable liquids, Hydrocyanic acid, Hydrogen Sulfide, Nitratable substances
Nitroparaffins	Amines, inorganic bases
Oxalic acid	Mercury, Silver
Oxygen	Flammable liquids, solids, or gases, grease, Hydrogen, oils
Perchloric acid	Acetic anhydride, Alcohol, Bismuth and its alloys, grease, oils, paper, wood
Peroxides, organic	Acids (organic or mineral)
Phosphorus (white)	Air, Oxygen
Potassium chlorate	Acids (also refer to chlorates)
Potassium perchlorate	Acids (also refer to percholoric acid)

Potassium permanganate	Benzaldehyde, Ethylene glycol, Glycerol, Sulfuric acid
Silver	Acetylene, Ammonium compounds, Fulminic acid, Oxalic acid, Tartaric acid
Sodium	Carbon dioxide, Carbon tetrachloride and other chlorinated compounds, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Any oxidizable substances (e.g., Acetic anhydride, Benzaldehyde, Carbon disulfide, Ethanol, Ethyl acetate, Ethylene glycol, Furfural, Glacial acetic acid, Methanol, Methyl acetate)
Sulphuric acid	Chlorates, Perchlorates, Permanganates

3. **NOTE:** Most schools are usually considered Small Quantity Generators by the Department of Environmental Protection.
 - Schools that do not know their regulator status should check with DEQ <https://www.deq.idaho.gov/> under waste and then educational tools and <https://www.epa.gov/sites/production/files/2015-10/documents/workbk.pdf>
 - <https://www.deq.idaho.gov/pollution-prevention/p2-for-schools/chemical-roundup-program/>
4. This school is on a Septic System OR Municipal Sewer System.
 - If on a Septic System:
 - ~ No liquid chemicals, other than appropriate cleaning chemicals, will be disposed of down the drain.
 - ~ Non-hazardous liquid chemicals may be solidified for solid waste disposal (i.e. put in the trash).
 - ~ Custodians must be notified of any chemicals put in the trash for disposal.
 - ~ Hazardous waste must not be disposed of down the drain or in the trash.
 - ~ Hazardous waste must be disposed of by a licensed hazardous waste transporter at a facility licensed to accept hazardous waste.
 - If on a Municipal Sewer System:
 - ~ Non-hazardous liquid may be disposed of down the drain with the permission of the **Mountain Home Sewer Authority – Public Works, at 587-2108.**
 - ~ Corrosive hazardous waste, which is hazardous only due to pH (i.e. no contaminants of heavy metals, solvents, etc.), and which is less than 500 milliliters in quantity, may be neutralized to a non-hazardous waste prior to disposal.
 - ~ Non-hazardous liquid chemicals may also be solidified for solid waste disposal (i.e. put in the trash).
 - ~ Custodians must be notified of any chemical put in the trash for disposal.

G. NATIONAL FIRE PROTECTION ASSOCIATION HAZARD LABELS -

1. The National Fire Protection Association (NFPA) has developed a visual guide for a number of chemicals pertinent to the MSDS.

- The ANSI/NFPA 704 Hazard Identification system, the NFPA diamond, is a quick visual review of the health hazard, flammability, reactivity, and special hazards a chemical may present.
2. The diamond is broken into four sections (blue, red, yellow, and white).
- The symbols and numbers in the four sections indicate the degree of hazard associated with a particular chemical or material.



Health Hazard (Blue)		
4	Danger	May be fatal on short exposure. Specialized protective equipment required
3	Warning	Corrosive or toxic. Avoid skin contact or inhalation
2	Warning	May be harmful if inhaled or absorbed
1	Caution	May be irritating
0		No unusual hazard

Flammability (Red)		
4	Danger	Flammable gas or extremely flammable liquid
3	Warning	Combustible liquid flash point below 100 °F
2	Caution	Combustible liquid flash point of 100° to 200 °F
1		Combustible if heated
0		Not combustible

Reactivity (Yellow)		
4	Danger	Explosive material at room temperature
3	Danger	May be explosive if shocked, heated under confinement or mixed with water
2	Warning	Unstable or may react violently if mixed with water
1	Caution	May react if heated or mixed with water but not violently
0	Stable	Not reactive when mixed with water

Special Notice Key (White)	
W	Water Reactive
OX	Oxidizing Agent

IV. RECOMMENDED PROTECTIVE CLOTHING, SAFETY, AND EMERGENCY EQUIPMENT

A. PERSONAL PROTECTIVE EQUIPMENT -

- Chemical splash goggles
- Face shields
- Lab coat
- Lab apron
- Gloves (selected based on the material being handled and the particular hazard involved)

B. SAFETY AND EMERGENCY EQUIPMENT (AS APPROPRIATE FOR THE LAB TYPE) -

- Hand-free eye-wash stations/fountain (not eye-wash bottles) that conform to ANSI Z358.1–2004
- Deluge safety showers, or other drench-style shower, that conform to ANSI Z358.1–2004 in any lab using chemicals
- Safety shields with heavy base
- Fire extinguishers (dry chemical and carbon dioxide extinguishers)
- Fire blankets
- Emergency lights
- Emergency signs and placards
- Fire detection or alarm system with pull stations
- First-aid kits
- Spill control kit (absorbent and neutralizing agents)
- Chemical storage cabinets (preferably with an explosion proof ventilation system)
- Gallon-size carrying buckets for chemical bottles
- Laboratory chemical hood (60–100 ft/minute capture velocity, vented outside)
- Ground-fault interrupter electrical outlets
- Container for broken glass and sharps
- Material Safety Data Sheets (MSDSs)
- Emergency Action Plan for the school
- Other safety equipment as required.
- Fire alarms
- Emergency telephone are located near each lab.
- Conduct work with toxic chemicals in a fume/vapor hood.
~ Confirm hood performance before use.

C. PROTECTIVE CLOTHING AND EQUIPMENT -

Clothing worn in the laboratory should offer protection from splashes and spills, should be easily removable in case of an accident, and should be fire resistant.

1. Conduct a personal protective equipment (PPE) hazard assessment to determine appropriate PPE for conditions, equipment and chemicals being used. List activities requiring PPE and type of PPE required:

2. Laboratory Hoods – will be used for all chemical procedures involving volatile substances with a Permissible Exposure Limit (PEL) less than 50 ppm. Work practices for hoods:
 - Keep sash closed when not working in the hood. When working in the hood, keep sash height as low as possible.
 - Do not store chemicals inside the hood.
 - Do not use hood for disposal of volatile chemicals.
 - Minimize interference with the inward flow of air into the hood.
 - Maintain face velocity between 75 and 125 feet per minute.
 - ~ The CHO is responsible for monitoring the hood and keeping records.
3. Students and staff will wear appropriate PPE to avoid chemical exposure.
 - Wear eye protection during chemical transfer and handling.
 - Do not wear sandals, perforated shoes, or bare feet in labs.
 - Shorts and skirts will not be worn unless a disposable apron is worn.
 - Gloves appropriate to the materials and task will be provided.
 - ~ All gloves have a breakthrough time.
 - ~ The teacher will check manufacturer’s recommendations.
 - The school will provide required PPE for all employees at no cost.
 - The user must inspect PPE before each use.
 - Defective personal protective equipment will not be used and will be reported to the CHO by the teacher.
 - Get a list of what the school provides students regarding PPE for students.

V. MEDICAL PROGRAM/FIRST AID/EXPOSURE ASSESSMENT (29 CFR 910.1450(e)(3)(ii)) (29 CFR 1910.1450(e)(3)(vi) and (g))

The Chemical Hygiene Plan shall include criteria that the employer will use to determine, and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls, the use of personal protective equipment and hygiene practices.

The Chemical Hygiene Plan shall include provisions for medical consultation and medical examinations in accordance with paragraph (g) of this section.

A. ENGINEERING CONTROLS -

1. Engineering controls are the preferred methods of minimizing exposure to chemicals. Controls must be maintained in proper working order.
2. Engineering controls must not be modified unless testing indicates the changes will not reduce protection.
3. Report improper functioning of engineering controls to the Chemical Hygiene Officer immediately.

B. EXPOSURE ASSESSMENT -

1. All chemical exposure incidents shall be documented on an accident report form along with any action taken.
 - Attach sample accident report form to this plan
 - If no further action is taken, the reason for that decision should be included.
 - The CHO is responsible for investigating chemical exposure incidents.

~ The CHO must include the method for investigating the exposure incident.

C. FIRST AID -

1. Personnel trained in first aid should be available during work hours.
 - Attach a list of staff who have receive first aid training and are expected to render first aid.
2. St. Luke's Elmore, 895 North 6th East, Mtn Home, ID, 83647, 587-8401 has the nearest Emergency Room.

D. MEDICAL CONSULTATION AND EXAMINATION -

1. When employees or supervisors suspect that an employee has been exposed to a hazardous chemical to a degree and in a manner that might cause harm to the victim, the victim is entitled to a medical consultation and examination without cost or loss of pay to the employee.
2. Medical records shall be retained according to state and federal laws in accordance with 29 CFR 1910.1020.
 - The events and circumstances that might result in overexposure to a chemical are:
 - ~ A hazardous chemical leak, was spilled, or otherwise released in an uncontrolled manner.
 - ~ A hazardous chemical was spilled on the skin or splashed in the eye.
 - ~ A person displays signs or symptoms that might indicate overexposure to a hazardous chemical including, but not limited to rash, headache, nausea, coughing, tearing, irritation or redness of eyes, irritation of nose or throat, dizziness, loss of motor dexterity, or judgment.
3. In the event of chemical exposure, employees will be sent to Elmore County Medical Center, or their family doctor for medical consultations/examinations.

VI. SIGNS AND LABELS (29CFR1910.1450 Appendix A (D)(8))

A. The following signs and/or labels should be posted prominently in the laboratory:

1. Emergency telephone numbers of emergency personnel, emergency facilities, administration, and the laboratory instructor.
Rescue: _____
Fire: _____
Hospital: St. Luke's Elmore, 895 North 6th East, Mtn Home, ID, 83647, 587-8401
Poison Control: _____
Administration: _____
Lab Instructor: _____
2. Labels on all chemicals and other containers indicating the contents (including waste receptacles) and associated hazards.
3. Location of exits, safety showers, eyewash station, fire extinguisher, fire blanket, and other safety equipment.
4. Label all laboratory refrigerators "NO FOOD STORAGE ALLOWED."
5. Warnings at areas or equipment where special or unusual hazards exist.

VII. INCIDENTS, ACCIDENTS AND SPILLS (29CFR1910.1450 Appendix A (D)(9))

A. GUIDELINES TO FOLLOW IN THE EVENT OF AN ACCIDENT OR SPILL -

1. Assess the overall situation.
2. Determine the appropriate action to resolve the situation.
 - The responsible staff will evacuate all persons from the spill or accident area until certain that the spill is not hazardous to people in the general area.
3. Follow the pre-existing, approved local emergency plan.
 - Each student, teacher, and staff member must know immediately what to do and where to go in case of any emergency.
4. Act swiftly and decisively.
5. In the event of an incident, accident, or spill, staff must contact the CHO, building administrator, custodian, and/or other authorized persons (Fire Department/Emergency Responders) before beginning cleanup.
 - The CHO or other authorized person will assess the nature of the spill using the School's Emergency Response Plan to determine appropriate response.
 - The Emergency Response Plan for this school is located: _____
 - All incidents, accidents, and spills will be reported to the building administrator.
 - Custodians and faculty cannot respond to chemical spills unless appropriate training and equipment has been provided.
 - Attach a list of people trained to conduct spill response at this school, and date training was conducted:
6. Follow up - After Incident Reports
 - The CHO is responsible for writing the accident report.
 - The CHO will maintain accident records.
 - The CHO is responsible for promptly addressing the needs of people who may have been exposed.
 - The CHO or other authorized persons must report the spill to the **Department of Public Safety (1-208-332-0102, Toll Free 1-877-443-3469)**.
7. All waste generated from a chemical spill will be treated as hazardous waste.

B. CHEMICAL TO HUMAN CONTACT IN A SCIENCE LAB -

1. Continuously flush the area with water for at least 5 minutes.
2. Immediately contact the school administrator or CHO.
3. Call the **Poison Control Center at 1-800-222-1222** and follow their directions.
4. If the person shows any signs of distress **call 911**.

C. CHEMICAL IN THE EYE -

1. Flush the eye immediately with water while holding the eye open with fingers.
2. If wearing contact lens, remove and continue to rinse the eye with water.
3. Continue to flush the eye for 15 minutes.
4. Contact the school administrator, or CHO, or **Dial 911 as appropriate**

D. ACID/BASE SPILL -

For a spill not directly on human skin, do the following:

1. Clear students from the area
2. Avoid inhaling vapors.
3. Place the appropriate sized chemical spill pillow over the spill or
4. Neutralize acids with powdered sodium hydrogen carbonate (sodium bicarbonate/ baking soda), or bases with vinegar (5% acetic acid solution).
5. Spread diatomaceous earth to absorb the neutralized chemical
6. Dispose of spill pillow or sweep up and dispose of diatomaceous earth as hazardous waste.

For spills directly on human skin, do the following:

1. Flush area with copious amounts of cold water from the faucet or drench shower for at least 5 minutes.
2. If spill is on clothing, first remove clothing from the skin and soak the area with water as soon as possible.
3. Contact the school administrator, CHO, or Dial 911 as appropriate (any chemical to human contact will be evaluated by medical personnel)

E. MERCURY SPILL (You should not have any mercury in your school) -

1. Evacuate the affected area.
2. Close off interior doors and windows, and heating and air conditioning vents in the incident room.
3. Open exterior doors and windows to move the inside air outside.
4. Follow specific cleanup instructions detailed by the EPA (<https://www.epa.gov/mercury>) and/or the state of Idaho.

F. UNINTENDED SPILL DOWN A FLOOR OR SINK DRAIN -

1. Contact the **Mountain Home Sewer Authority – Public Works, at 587-2108**, Fire Department, or Emergency Responders.

VIII. INFORMATION AND TRAINING (29CFR1910.1450(f))

- A. All employees will be trained on the hazards of the chemicals in the laboratory and how to work safely with them. They will receive training at the time of employment and prior to assignments involving new exposure situations.
- B. Teachers are responsible for teaching students about hazards and safe practices.
- C. The CHO is responsible for ensuring that employees receive information and training to ensure they are aware of the hazards of chemicals that are present in their work area. This training must include the following:
 - The contents OSHA Lab Standard and appendices;
 - Location and availability of Chemical Hygiene Plan, chemical safety reference materials, including Material Safety Data Sheets (MSDS), and the Permissible Exposure Limits for OSHA regulated substances.

- ~ The Chemical Hygiene Plan is kept _____
- ~ Material Safety Data Sheets are kept _____
- ~ Additional safety information is located _____
- Signs and symptoms associated with exposure to hazardous chemicals.
- Methods and observations that may be used to detect the presence or release of a hazardous chemical (visible appearance, odor, monitoring equipment, etc.).
- Knowledge of the hierarchy of protective measures such as engineering controls, work practices, personal protective equipment, and emergency procedures to protect workers from overexposure to hazardous chemicals.
- Emergency procedures to be used in case of a spill or exposure, including cleanup methods and equipment needed.
- Use of fire extinguishers and other poison
- equipment.

IX. ANNUAL CHEMICAL HYGIENE PLAN AUDIT (29CFR1910.1450 (e)(4))

- A. The CHO will conduct an audit of all phases of the Chemical Hygiene Plan each year.
- B. He or she will provide audit results to the building administrator and the superintendent and any other authorized person who is responsible for taking corrective action.

Legal Reference: Idaho Code Title 39, Health and Safety, Chapter 44, Hazardous Waste Management
 29CFR1910.1450
www.epa.gov/greenchemistry/
<https://www.epa.gov/laws-regulations>
<https://www.epa.gov/mercury>
<https://www.epa.gov/sites/production/files/2015-10/documents/workbk.pdf>
<https://www.epa.gov/schools/law-regulation-and-policy-resources>
<https://www.deq.idaho.gov/>
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<https://www.acs.org/content/acs/en/greenchemistry.html>
http://www.flinnsci.com/search_MSDS.asp
<http://www.msdonline.com>

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