Model - Chemical Hygiene Plan -

Date

Toxic, burn, cutting, chemical and other hazards.
Read, understand, and follow the instructions below to avoid harm or injury.

This plan is intended to meet the requirements of the OSHA Laboratory Standard (29 CFR 1910.1450). A copy of this plan is available to all employees, students, and invitees of \_\_\_\_and is available in the \_\_\_\_\_\_. A copy of 1910.1450 is available in the \_\_\_\_\_\_\_.

# Responsibilities

## Laboratory Teacher Responsibilities

1. Educate students regarding safety in the laboratory:

* Provide overview of this Plan and its principal provisions.
* Explain safe lab practices and procedures for all chemicals and types of chemicals used. Explain safe practices for specific procedures and experiments.
* Explain and practice emergency procedures.
* Inform of availability of PPE (personal protective equipment), and provide instruction on how and when PPE is to be used. Wear PPE as appropriate.
* Explain proper conduct and attitude in the lab. Explain proper clothing and hygiene, and consequences of inappropriate conduct.

2. Provide the \_\_\_\_\_Safety Officer with a list of all laboratory chemicals used; inform the Safety Officer if there are changes in use. The Safety Officer will maintain the master MSDS notebook in the Main Office, and provide a copy for the laboratory.

3. Select, store, use, and dispose of chemicals in accordance with the provisions of this Plan.

4. Propose, for approval, an annual budget for chemicals, including the cost of legal disposal.

5. Be familiar with safe storage, handling, usage, and disposal for all chemicals used in the laboratory. Understand applicable exposure limits for all chemicals used, and make sure limits are not exceeded. Conduct monitoring of air if exposure limits are in doubt. Maintain awareness of possible exposure to hazardous chemicals, and of symptoms of chemical exposure.

6. Establish and maintain good housekeeping in the laboratory. Inspect all laboratory equipment and safety equipment on a regular basis. Report any hazardous or unsafe condition to the Safety Officer in writing or by e-mail. Ensure that all experiments are properly cleaned up by the end of the class period, and that all materials are properly disposed of.

7. Provide a written report to the Safety Officer of any "laboratory incidents." A laboratory incident is an exposure to harmful chemical, observed symptoms of chemical exposure, any injury, or spillage of hazardous materials.

8. Annually clean up laboratory, organize chemicals, dispose of hazardous materials in cooperation with the Safety Officer, and obtain new supplies.

9. Flush eye wash stations weekly to ensure they are operating correctly.

10. Perform Personal Protective Equipment audit using MSDS to determine appropriate PPE for tasks/experiments conducted by students and teachers.

11. Inspect chemical cabinets annually to ensure the integrity of the cabinet.

## Student Responsibilities

1. Learn, understand, and follow the requirements of the teacher and this Plan regarding all laboratory activities.

##  Responsibilities

1. Maintain a master list and notebook for MSDS's for all chemicals used in the laboratory.

2. Designate a Laboratory Safety Officer. The Laboratory Safety Officer is the Chemistry Teacher.

3. Make adequate PPE available. Provide a fume hood. Provide adequate safety equipment, storage equipment. Provide sharps containers as appropriate.

4. Cooperate with the Safety Officer to properly dispose of chemicals.

5. Ensure that adequate training is available for other laboratory personnel (if any) or others who may have contact with laboratory chemicals and supplies. Maintain records of training for 3 years. The Laboratory Safety Officer is qualified to train others.

6. Maintain a record of any "laboratory incidents" for 3 years. Provide for appropriate medical follow-up in the event of an exposure to a hazardous chemical.

7. Make sure that the laboratory space is suitable for its intended purpose, including necessary ventilation, electrical fittings, alarm systems, chemical waste systems, etc.

# Chemical Management

## Selection and Purchase

1. Where feasible, substitute a less hazardous chemical for the more hazardous. Where feasible, select chemicals that will not require disposal as hazardous waste. Avoid chemicals that require above normal ventilation. Consider "worst case" scenarios associated with each particular chemical.

2. Where feasible, use “micro-scale” or pre-packaged chemicals that will be used up in the course of a single experiment or activity. Avoid experiments that will generate excessive hazardous waste. Where feasible, avoid chemicals that will require mechanical ventilation. Avoid the use of chemicals that would necessitate a deluge shower. Where feasible avoid experiments that generate hazardous substances.

3. Where feasible, order only what will be used within one year or less.

4. Label each chemical with the date received and the "hazard index" (health, flammability, reactivity, exposure, storage).

5. Do not accept gifts of chemicals. Exceptions to this rule require the assent of the \_\_\_\_\_\_ in each case.

6. Obtain MSDS's for all chemicals in use (from the Safety Officer based on information from the chemistry teacher.) (Note: consumer products, used as intended by the manufacturer, do not require MSDS's.)

7. The following specific materials and equipment are prohibited:

* Alcohol lab burners.
* Gasoline.
* Flammable gases.
* Mercury thermometers.
* Nitric acid, unless essential for quality instruction.
* Ammonium nitrate unless essential for quality instruction.
* "Gorilla" glue.
* Methyl orange or methyl red.
* Lead chromate.
* p-Dichlorobenzine
* Alcoholic potassium hydroxide.
* Picric acid.
* Radioactive substances.

## Storage and Disposal

1. Store chemicals by **compatibility**, not by name, in appropriate lockable cabinets. Appendix A shows a plan for storage of chemicals. Appendix C shows "bad combinations" of chemicals, which must be avoided. (Note: if “pre-packaged microscale” chemicals are used, compatibility is no longer an issue for storage.)

2. At the end of the school year, cooperate with the Safety Officer to dispose of chemicals that are no longer in use, are out of date, unneeded for any reason.

3. Where possible, store chemicals in original, labeled containers showing the date received, date first opened, and expiration date. If chemicals are placed in different containers they **must** be labeled with the chemical name, concentration or purity, manufacturer, and necessary handling and hazard information. Labels are available in the Laboratory. (Refer to Appendix B regarding labeling requirements.)

4. Chemicals that required ventilation may be stored in a cabinet that has passive (non-mechanical) ventilation to the outside air.

5. Do not store containers of chemicals above eye level, on tops of cabinets, on the floor. Make sure containers are properly closed. Do not store heavy containers above waist height.

# Required Specific Lab Practices

## Behavior and Conduct in the Laboratory

1. Be aware of the consequences of inappropriate conduct.

2. No running, pushing, shoving, boisterous activity in the laboratory.

3. Do not perform experiments or use laboratory chemicals unless a teacher is present.

4. Do not perform unsupervised or unauthorized experiments.

5. Do not remove chemicals from the laboratory or perform experiments at home unless part of an approved lesson or activity.

6. Do not bring food or beverages into the laboratory; no eating in the laboratory. Exceptions to this policy require the assent of the Head of School in each case (i.e. for graduation or special events) and if so all chemicals must be put away, all surfaces cleaned. **Never** use laboratory glassware for eating or drinking.

7. Report any injuries or exposure to chemicals to the teacher.

8. Inform the teacher if you know you are sensitive or allergic to particular chemicals.

## Emergencies

1. Be aware of and follow written emergency procedures. (Appendix D.)

2. Refer to the emergency phone numbers listed in the *Crisis Prevention Policy and Procedure* in the \_\_\_\_\_\_\_\_\_.

3. Know how to shut off electrical power, water. If possible, the teacher should be the one to shut off services in an emergency.

4. Be aware of and use emergency equipment, including first aid kit, fire extinguishers, alarm system, fire blanket, eye wash, spill kit.

5. Report any chemical spill to the teacher; use appropriate procedures for clean-up and disposal. In general, the teacher must supervise or perform clean-up and disposal.

## Personal Protective Equipment (PPE)

1. Wear appropriate PPE (teacher and students.) Wear disposable gloves, safety goggles and laboratory apron **whenever** working with laboratory chemicals.

## Clothing

1. Do not wear open shoes if experiments with hazardous chemicals are to be performed. Likewise, avoid clothing which exposes skin areas.

2. Avoid loose clothing that can inadvertently contact chemicals or equipment.

3. Secure long hair, jewelry.

## Storage

1. Lock all chemical storage cabinets.

2. Store reagents in polyethylene bottles.

2. Acids must be stored in a separate non-metallic cabinet labeled "Corrosive." Nitric acid must be stored separately in its own non-metallic cabinet, or in a separate compartment intended for the purpose.

3. Toxic substances must be stored in a separate cabinet labeled "Toxic."

4. Flammables must be stored in a separate cabinet labeled "Flammables."

5. Volatile chemicals must be stored in a ventilated cabinet that has passive (non-mechanical) ventilation to the outside air.

6. Be aware of any film or haze inside a storage cabinet. This generally indicates that the material is escaping and represents an unsafe condition.

## Disposal

1. Properly dispose of chemicals and hazardous waste, only under the supervision of the Laboratory Safety Officer (and in cooperation with the Safety Officer).

2. Where feasible, neutralize or treat hazardous chemicals in a way that will render them benign.

3. Do not put **any** chemicals down the drain unless they are **known** to be benign and compatible with an on-site waste treatment system (septic tank and leach field). Only sinks in the chemistry Room (#114) shall be used to dispose of acids.

4. Dispose of used chemicals in containers provided for the purpose. In general, separate containers are required for different waste materials; chemicals stored for disposal in the same container must be **known** to be compatible. Do not completely fill waste containers. All containers containing hazardous waste must be labeled indicating the contents.

5. Store hazardous waste in proper storage cabinets in the Laboratory, separate from chemicals in use. From time to time hazardous materials will be picked up by a licensed hauler or safely disposed of through the\_\_\_\_\_\_\_\_\_\_\_\_\_\_Waste Management District.

6. Never dispose of an **unknown** material down the drain or in the normal waste stream; any unknown material must be analyzed and properly disposed of, by licensed professionals where appropriate.

## General Procedures for Work with Laboratory Chemicals

1. Check the label before using any chemical. Make sure it is the correct chemical for the activity.

2. Wear disposable gloves, safety goggles and laboratory aprons **whenever** working with laboratory chemicals.

3. Never leave an experiment in progress.

4. Never handle a container that is wet or too heavy for you.

5. Never fill a pipette using mouth suction; always use a pipetting device.

6. Use a spatula or scoopula to remove chemicals from containers. Never use metal implements for peroxides. Only weigh out as much chemical as you will need for the experiment.

7. Add concentrated acid to water slowly; never add water to a concentrated acid.

8. Keep hands away from face, mouth, eyes, ears, and body when using laboratory chemicals. Never taste or smell chemicals unless specifically instructed to do so by the teacher. Don't touch chemicals with your bare hands.

9. All experiments must be cleaned up when they are finished. The teacher must explain and the students must follow proper clean-up and disposal procedures. Never pour chemicals into the sinks unless specifically instructed to do so. Properly dispose of gloves, chemicals, towels, and sharp objects as instructed by the teacher.

10. Use the fume hood when working with volatile or toxic chemicals. MSDS sheets indicate when a fume hood should be used.

11. Any flames must be extinguished when not in actual use. Never leave any flame unattended.

12. Do not attempt to catch falling objects; they may be hot, sharp, toxic, etc.

13. Do not pick up glassware unless you know it is cool; hot glassware looks just like cool glassware. Use tongs or gloves to pick up.

14. Use a hot water bath to heat flammable substances; never use a flame.

# Updates to this Plan

This plan shall be reviewed annually, and updated if necessary.

**Adopted**

Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Appendix A - Storage Plan for Laboratory Chemicals

## Shelf Storage Pattern for Inorganics

|  |  |  |
| --- | --- | --- |
| **Storage Cabinet #1** |  | **Storage Cabinet #2** |
| **Inorganic # 2**Halides, Halogens, **Phosphates, Sulfates,** Sulfites, Thiosulphates, **Chlorides**  | **Inorganic # 5**Carbides, Nitrides, Phosphides, Selenides, Sulfides |  | **Inorganic # 1**Hydrides, MetalsStore away from water. Flammables in separate cabinet.  | **Inorganic # 6**Chlorates, Chlorites, Hypochlorites, **Hydrogen Peroxide,** Perchlorates, Perchloric Acid, Peroxides. |
| **Inorganic # 3**Amides, Azides, **Nitrates**, Nitrites. | **Inorganic # 8**Borates, Chromates, Manganates, **Permanganates** |  | **Inorganic # 4**Carbon, **Carbonates, Hydroxides,** Oxides, Silicates | **Miscellaneous** |

|  |
| --- |
| **Corrosive Storage Cabinet****Inorganic # 9**Bold indicates substances presently in use. **Acids, Sodium Hydroxide** |

|  |
| --- |
| **Acid Storage Cabinet****Inorganic**  |

* Ammonium nitrate is not in use.
* Nitric acid is not in use.

Do not store chemicals on the floor.

##  Shelf Storage Pattern for Organics

|  |
| --- |
| **Flammable Storage Cabinet****Flammable Organic # 2****Alcohols,** Glycols, **Butane, Flammable Metals, Phenolpthalien,** etc.  |

* Other organics are not in use.

Bold indicates substances presently in use.

Do not store chemicals on the floor.

# Appendix B - Labeling Requirements

All chemicals used in the Laboratory shall be labeled. It is **strongly preferred** that all chemicals remain in their **original containers**, which must contain all the following information:

* Chemical name (as it appears on the MSDS).
* Concentration or purity.
* Manufacturer.
* Storage/handling instructions (may be referenced to other documents if appropriate).
* "Hazard Index" (health, flammability, reactivity, exposure, storage).
* Shelf life or expiration date.

If not already present, add the following:

* Date received, date opened. Peroxide forming chemicals must include a date to be disposed of.

If chemicals are moved to other containers they must be labeled with the same information as above, plus the date prepared if applicable.

# Appendix C - "Bad Combinations" of Chemicals

This table lists **some** hazardous combinations of chemicals. Combining a chemical in List A with a chemical on the same line in List B can create violent reactions, highly toxic gases.

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| --- | --- |
| **List A** | **List B** |
| Acids | Azides, cyanides, nitrites, sulfides |
| Alcohols (methyl and ethyl) | Sodium peroxide |
| Ammonium salts | Bromine, iodine, sodium nitrate, silver |
| Copper | Hydrogen peroxide |
| Hydrogen sulfide | Nitric acid |
| Nitric acid | Acetone |
| Permanganates | Acetic acid |
| Potassium salts | Sulfuric acid |
| Sulfuric acid | Acetone, nitrates |
| Water | Alkaline earth metals, calcium oxide |