CHEMICAL HYGIENE PLAN

Clinton Public Schools, (CT)

The Morgan School
71 Killingworth Turnpike, Clinton, CT 06413

Jared Eliot Middle School
69 Fairy Dell Road, Clinton, CT 06413

CHEMICAL HYGIENE PROGRAM OFFICER

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An up-to-date electronic version of this Chemical Safety Hygiene Plan is available on-line at the following address:

www.clintonpublic.net/departments/facilities/ChemicalHygienePlan/

(Edition-01)

School Names:

The Morgan School (TMS)
Jared Eliot Middle School (JEMS)

Department: Science Department

Instructional spaces (e.g., laboratories, classroom, related areas) covered by this plan:

TMS: Science Rooms #D07, D09, D10, A27, A28, A29

JEMS: Science Rooms #6, 9, 17, 18, 19

Administrators responsible for plan implementing:

TMS: Christopher Luther

JEMS: Mike Gourdier

Science Department Chairperson: Emily Lisi

Designated Individuals Responsibility

Marco Famiglietti	District Chemical Hygiene Officer
Gonzalo Carrion	Hazardous Waste Manager
Marco Famiglietti	District Safety Officer

Implementation Date: 01 June 2023

Annual Review Date: June

Chemical Hygiene Officer's Signature:

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Emergency Telephone Numbers

FIRE 911
MEDICAL EMERGENCY 911
SECURITY EMERGENCY 911
POISON CENTER 800-222-1222

Alternate formats available
Phone: (860-664-6504 TMS)
(860-664-6503 JEMS)

School Year: _____2023-2024_____

Employees covered by this school's chemical hygiene plan: Middle school and high school science teachers.

Note: Occasional visitors to the laboratory, such as a guest or salesperson, isn't defined as an employee and therefore doesn't need to be addressed in the Chemical Hygiene Plan.

The Chemical Hygiene officer or appointee is the designated individual with specific chemical hygiene responsibilities

1. Annual inspection of chemical containers
2. Updating the chemical inventory
3. Providing spill response training
4. Hazardous waste disposal
5. Annual fume hood testing
6. Testing eye washes weekly
7. Testing safety showers weekly
8. Checking fire extinguishers monthly and full inspection annually
9. Maintaining chemical safety data sheets (SDSs)
10. Training new staff in the Hygiene Plan
11. Approval of lab chemical procurement

Table of Contents

2. Who is Covered by the Laboratory Standard?
3. Summary of the Requirements

B. Chemical Hygiene Personnel

1. Goal
2. Key Personnel and Their Responsibilities

C. Standard Operating Procedures for Laboratories

1. Goal
2. Online Resources
3. Employee Exposure Protection
4. Laboratory Facilities Design Criteria including Occupancy Load Codes
5. Employee Exposure Determination and Monitoring
6. Medical Consultations and Medical Exams
7. Chemical Procurement
8. Hazard Identification
9. Material Handling
10. Laboratory Operations and Activities Requiring Approval
11. Emergency Prevention and Response
12. Waste Disposal
13. Information and Training
14. Inspections and Reviewing the Chemical Hygiene Plan

D. General Laboratory Safety Rules

1. Goal
2. General Rules
3. Chemical Handling
4. Health and Hygiene
5. Food Handling
6. Housekeeping
7. Glassware
8. Flammability Hazards

E. Specific Exposure Control Measure

1. Goal
2. Criteria
3. Chemicals of special concern
4. Exposure Potential
5. Exposure Controls
6. Decontamination Procedures
7. Procedures for Handling Reproductive Toxins
8. Procedures for Handling Chemicals with High Acute Toxicity
9. Procedures for Handling Select Carcinogens

A. Introduction

1. Goal of the Chemical Hygiene Plan

It is the policy of this school to provide a place of employment that is free from chemical exposures likely to harm employees' health, and that complies with all federal, state, and local laws and regulations affecting the safety and health of its employees. This Chemical Hygiene Plan addresses this goal for the laboratory workplace by including the requirements of the Occupational Safety and Health Administration (OSHA) Standard on Occupational Exposure of Hazardous Chemicals in Laboratories under Connecticut State OSHA.

2. Who is covered by the Laboratory Standard?

The laboratory standard covers "laboratory use of hazardous chemicals" where chemical manipulations occur that are not part of a production process.

"Laboratory scale" means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. This definition excludes workplaces whose function is to produce commercial quantities of materials.

Employees who are to be addressed in the Chemical Hygiene Plan are individuals employed in the laboratory workplace that may be exposed to hazardous chemicals in the course of his or her assignments. This includes employees who actually work in the laboratory (instructors and aides) or employees who may be required to enter a laboratory where potential exposures may occur (such as maintenance or custodial personnel).

3. Summary of the requirements

a. The laboratory standard requires that covered laboratories prepare, implement, and make available to employees a Chemical Hygiene Plan which is capable of:

- Protecting employees from health hazards associated with hazardous chemicals in the laboratory.
- Keeping laboratory employees' exposures below OSHA permissible exposure limits (PELs).

b. The Chemical Hygiene Plan should include:

- Procedures for determining employee exposure that includes: initial monitoring, periodic monitoring, and employee notification of the monitoring results.
- Employee information and training to ensure that they are apprised of the hazards of chemicals present in their work area(s).
- Procedures for employees who work with hazardous chemicals to receive medical attention under specified circumstances.

- A system for hazard identification of incoming containers of chemicals and for chemical substances developed in the lab.
- Requirements for the use of proper respiratory equipment, where necessary, to maintain exposure below PELs.
- Record keeping procedures for employee exposure monitoring measurements and medical records.

c. **1910.1450(b)** OSHA Laboratory Standard ***Definitions —***

Action level means a concentration designated in 29 CFR part 1910 for a specific substance, calculated as an eight (8)-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Carcinogen (see *select carcinogen*).

Chemical Hygiene Officer means an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.

Chemical Hygiene Plan means a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that (i) are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace and (ii) meets the requirements of paragraph (e) of this section.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.

Employee means an individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignments.

Hazardous chemical means any chemical which is classified as health hazard or simple asphyxiant in accordance with the Hazard Communication Standard (§1910.1200).

Health hazard means a chemical that is classified as posing one of the following hazardous effects: Acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in appendix A of the Hazard Communication Standard (§1910.1200) and §1910.1200(c) (definition of "simple asphyxiant").

Laboratory means a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory scale means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person.

"Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

Laboratory-type hood means a device located in a laboratory, enclosure on five sides with a moveable sash or fixed partial enclosed on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

Walk-in hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne hazardous chemicals.

Laboratory use of hazardous chemicals means handling or use of such chemicals in which all of the following conditions are met:

(i) Chemical manipulations are carried out on a "laboratory scale;"

(ii) Multiple chemical procedures or chemicals are used;

(iii) The procedures involved are not part of a production process, nor in any way simulate a production process; and

(iv) "Protective laboratory practices and equipment" are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Medical consultation means a consultation which takes place between an employee and a licensed physician for the purpose of determining what medical

examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

Mutagen means chemicals that cause permanent changes in the amount or structure of the genetic material in a cell. Chemicals classified as mutagens in accordance with the Hazard Communication Standard (§1910.1200) shall be considered mutagens for purposes of this section.

Physical hazard means a chemical that is classified as posing one of the following hazardous effects: Explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid, or gas); self-reactive; pyrophoric (gas, liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; in contact with water emits flammable gas; or combustible dust. The criteria for determining whether a chemical is classified as a physical hazard are in appendix B of the Hazard Communication Standard (§1910.1200) and §1910.1200(c) (definitions of "combustible dust" and "pyrophoric gas").

Protective laboratory practices and equipment means those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Reproductive toxins mean chemicals that affect the reproductive capabilities including adverse effects on sexual function and fertility in adult males and females, as well as adverse effects on the development of the offspring. Chemicals classified as reproductive toxins in accordance with the Hazard Communication Standard (§1910.1200) shall be considered reproductive toxins for purposes of this section.

Select carcinogen means any substance which meets one of the

following criteria:

(i) It is regulated by OSHA as a carcinogen; or

(ii) It is listed under the category, "known to be carcinogens," in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or

(iii) It is listed under Group 1 ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (latest editions); or

(iv) It is listed in either Group 2A or 2B by IARC or under the category, "reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:

(A) After inhalation exposure of 6¿7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m^3;

(B) After repeated skin application of less than 300 (mg/kg of body

weight) per week; or (C) After oral dosages of less than 50 mg/kg of

body weight per day.

B. Chemical Hygiene Personnel

1. Goal

Successful development and implementation of a Chemical Hygiene Plan requires the full commitment of the senior administrators, the school district Safety Program Manager and laboratory Chemical Hygiene Officer. Implementation of this plan must be by the Safety Program Manager and the Chemical Hygiene Officer(s). The Chemical Hygiene Officer's goal is to ensure that responsibility for chemical hygiene and safety in the laboratories is shared by all who work in those laboratories, including students.

2. Key personnel and their responsibilities

a. Chemical Hygiene Officer

The school's Superintendent shall appoint a Chemical Hygiene Officer for the school. Their responsibilities include:

- Making sure this chemical hygiene plan is readily available to employees and their representatives.
- Records: Maintaining adequate records detailing efforts and results of employee exposure monitoring (including associated accident reports, if applicable) and medical consultations and examinations.
- Training: Ensuring that employees are provided with the required and appropriate annual training to carry out their responsibilities.
- Monitoring the legal safety standards and better professional safety practice

requirements concerning hazardous substances.

b. Laboratory staff

Laboratory instructors are responsible for planning and conducting laboratory operations in accordance with the appropriate procedures and rules outlined in the Chemical Hygiene Plan. The instructors are also responsible for developing good personal chemical hygiene habits.

c. Students

Although students are not covered under the OSHA Chemical Hygiene Plan, good personal chemical hygiene habits must also be taught to all students who use the lab while enrolled in science courses. Students must not be allowed to use the school district laboratory outside of regular science course classes, unless they first obtain permission and are directly supervised during their work. Students are also required to follow safety protocols noted in the Chemical Hygiene Plan in order to secure and maintain a safer working environment for the school employees and other students.

In order to provide for a safer teaching/learning hands-on experience, students need to be given a high school or middle school Safety Acknowledgment Form as appropriate. This form indicates the safety protocols students are required to follow when in the laboratory. Safety is the most important part of a science lesson. This includes monitoring student behavior and taking care of lab materials and equipment. The National Science Teaching Association's "Safety Acknowledgment Form" is a model for use in the high school science classroom, laboratory, and field site. It can be given to students at the beginning of the school year— after safety training is completed—to help them understand their role ensuring a safer and more productive science experience. It can be found at:

High School Form:

https://static.nsta.org/pdfs/SafetyAcknowledgmentForm-HighSchool.pdf

Middle School Form:

https://static.nsta.org/pdfs/SafetyAcknowledgmentForm-MiddleSchool.pdf

C. Standard Operating Procedures for The Science Laboratory

1. Goal:

To protect employees and students working in the laboratory, and others who may be exposed, and to protect the environment from injury or contamination due to hazardous chemicals.

2. On-line resources:

Visit these websites and familiarize yourself with their laboratory safety information: OSHA Laboratory standard - https://www.osha.gov/laboratories

3. Employee exposure protection

Laboratory operations must be conducted in a manner that prevents employee exposure to chemical substances in excess of the PELs listed. Permissible Exposure Limits – Annotated Tables - https://www.osha.gov/annotated-pels

a. Respiratory equipment

Respirators are not an acceptable substitute for a properly functioning chemical fume hood when attempting to keep employee exposures below PELs. If a chemical fume hood is unavailable, a safer alternative activity must be secured. Employee are prohibited from using respirator equipment.

b. Personal protective equipment

Personal protective equipment (PPE) and instructions on the proper use of this equipment must be provided to employees, as appropriate, to minimize exposure to hazardous chemicals.

4. Laboratory facilities design criteria

The work conducted in a lab must be appropriate to the physical facilities available and to the quality of the ventilation system.

a. Laboratory design

See *Appendix 3. Science classroom and lab safety reference and checklist* for a detailed list of requirements.

Laboratory facilities should include, where appropriate:

- An adequate and continuous flowing general laboratory ventilation system with 100% air intakes and exhausts located to avoid intake of contaminated air per the NFPA 45 standard.
- Well-ventilated stockrooms and storerooms.
- Proper chemical storage for specific hazardous materials; e.g., flammables, corrosives, poisons and oxidizers.
- Adequate laboratory hoods and sinks.
- Emergency equipment including fire extinguishers, spill kits, and alarms.
- First aid equipment including first aid kits, eyewash fountains and drench Showers.
- Drain-free floors in chemical storage rooms.

b. Laboratory ventilation

- The general laboratory ventilation system should provide a source of air for breathing and for input to local ventilation devices, ensuring that laboratory air is continually circulated, and direct air flow into the laboratory from non-laboratory areas and out to the exterior of the building.
- General laboratory ventilation should operate at a continuous rate per NFPA 45. Use local exhaust systems such as chemical fume hoods to control exposures from hazardous fumes, dusts and vapors. The American Society of Heating, Refrigerating, and Air Conditioning Engineers recommends 15-to-20 cubic feet per minute (CFM) per person in school classrooms and higher rates for more hazardous areas.
- There must be at least one fume hood for each laboratory where hazardous chemicals are being used. With the sash raised to 12 inches, air should enter the fume hood at 60-to-125 linear feet per minute - checked quarterly with a velocity meter or anemometer. Maintain written documentation of all tests.
- Cabinets that store corrosive acids should have open ventilation holes to prevent accumulation of corrosive vapors.
- Flammable liquids cabinets must be kept closed unless they are equipped with an explosion-proof auxiliary exhaust ventilation system. Stockrooms should have their own dedicated ventilation system that provides additional air exchanges.
- The quality and quantity of ventilation should be evaluated when installed, monitored regularly (at least every six months), and reevaluated whenever a change in ventilation medical consultations and medical exams

Employees who work with hazardous chemicals will be allowed to receive medical attention when overexposure to a hazardous chemical is suspected. (Refer to Section 8.)

c. Occupancy Load Code

Laboratory occupancy must be in concert with the legal safety standard NFPA 101 Life Safety Code, Section 1101.7.1 occupant load (50 sq. ft./occupant net in science labs). It also needs to be followed by the better professional safety practice of the National Science Teaching Association (NSTA) safety practice found at:
https://static.nsta.org/pdfs/OvercrowdingInTheInstructionalSpace.pdf

This practice states that science class sizes in every class (not average over all classes) be limited to 24 (high school/middle school) students if there is at least 60 square feet/student net in a combination of classroom/laboratory room or 50 square feet/student net in a pure laboratory room

This laboratory occupancy load is required by the CSP to effect a safe working environment for students and personnel. The occupant load of an educational occupancy or a portion thereof shall be permitted to be modified from that specified if the necessary aisles and exits are provided. Modification must be approved by the authority having jurisdiction. Given that this is an important health and safety responsibility of the science teacher, he or she is required to notify the CHO relative to laboratory occupancy concerns within one working day. In turn, the CHO must notify the CAO in writing of this situation within one working day. This notice will serve as acknowledgement of a situation which does not meet the professional standard or safety code.

Laboratories in which special needs students are assigned must have appropriate paraprofessional support, handicapped furniture, etc. to maintain a safe working environment. Notice of each concern must be made in writing to the CHO. Subsequent action will depend upon professional standards and safety codes.

5. Chemical procurement

Do not accept donations of chemical compounds.

Purchase chemicals for the laboratory in accordance with the Chemical Hygiene Plan. Staff are prohibited from purchasing or storing restricted chemicals. (See list in *Appendix 1. Restricted Chemicals.*)

a. Purchase approval

Buy no more than a five-year supply of laboratory chemicals at a time. It is only acceptable to exceed this limit if the chemical is not available in a smaller container.

b. Receiving shipments

Request safety data sheets for all chemicals being purchased. Understand proper handling, storage and disposal before ordering chemicals. Inspect chemical containers when they arrive. Open shipping boxes and Styrofoam outer containers when chemical products arrive. This allows you to see if containers or contents have been damaged in shipping. Return even slightly damaged new containers for refund and replacement.

c. Carcinogens, reproductive toxins or highly acute toxins are not allowed in the middle school laboratory.

- Many of these compounds are on the Restricted Chemicals List.
- Carcinogenic metals include chromates, dichromates, cadmium compounds, cobalt compounds, and nickel compounds.
- Reproductive toxins include lead compounds, mercury compounds, bromates and the carcinogenic metals.

Minimize the number, variety, and amount of these compounds in storage. Purchase as prediluted solutions if possible and only handle them in the fume hood if dusts or vapors could be released.

6. Hazard identification

Properly label laboratory chemicals to identify any hazards associated with them.

a. Container labels

Labels on incoming containers of hazardous chemicals must not be removed or defaced. Do not open unlabeled bottles of chemicals. Ask laboratory staff if they know what is stored in unlabeled containers. Dispose of unknown chemical compounds promptly as outlined in Section 12. Waste Disposal. When dispensing chemicals from one container to another, label the new container with the chemical's name and hazards. Label all secondary containers in this manner unless they are intended for immediate use by the person who dispensed the chemicals.

Label reusable pipettes with the chemical formula of the solution they contain. Return pipettes to a storage container that is labeled with the chemical's name, formula and hazards.

b. Safety Data Sheets

Maintain Safety Data Sheets received with incoming shipments of hazardous chemicals and make them readily available to staff and students.

By mid-2016, Safety Data Sheets must have been provided that follow the Globally Harmonized System for Classification and Labeling of Chemicals (GHS). GHS Safety Data Sheets have 16 sections, hazard pictograms, hazard statements, and precautionary statements.

Contact your chemical supplier and request replacement Safety Data Sheets to replace old Material Safety Data Sheets that remain in your collection after this date. Archive old Material Safety Data Sheets according to your school's record-retention schedule. OSHA Standard 29 CFR 1910.1020, and several letters of interpretation, note employers are not required to keep material safety data sheets, MSDSs, for 30 years. They are required however to keep some record of the identity of the substances or agents to which employees are exposed for 30 years.

c. Laboratory signs

Laboratory areas that have special or unusual hazards should be posted with warning signs.

Signs should be posted to show the location of safety showers, eyewash stations, exits, first aid kits, fire extinguishers, emergency numbers, etc.

Extinguishers should be labeled to show the type of fire for which they

are intended. Label waste containers to show the type of waste that

can be safely deposited in them. Consumption of food and beverages

is not permitted in the science laboratory.

Refrigerators used for chemical storage must have this warning sign posted: "CHEMICAL STORAGE – NO FOOD OR BEVERAGES ALLOWED!"

All other refrigerators in laboratory spaces must have this warning sign

posted: "FOOD STORAGE ONLY – NO CHEMICALS OR LAB

SPECIMENS ALLOWED!"

7. Material handling

Store, distribute, and handle hazardous chemicals in a manner that minimizes the potential for accidents and employee exposure.

a. Stockrooms/Storerooms

Segregate hazardous chemicals by hazard class in a well-identified area with local exhaust ventilation. (See *Appendix 2. Storage pattern for chemicals where space is limited.*)

Stockrooms should be under the control of one person who handles safety and inventory control. Examine stored chemicals for replacement, deterioration, and container integrity annually. Ensure safety data sheets (SDSs) are available for all chemical compounds in stock.

b. Distribution

Transport chemical containers using a laboratory cart, if possible. Carts should provide sufficient secondary containment capacity to control potential spills. Place containers in a laboratory bottle carrier to reduce risks of breakage.

To avoid exposure to elevator passengers, transport chemicals on freight-only elevators, if possible.

Purchase plastic-coated chemical containers to reduce the risk of spills.

Never roll or drag compressed gas cylinders. Transport cylinders with a suitable handcart with the cylinder strapped in place.

c. Laboratory storage

Keep quantities of chemicals stored in the laboratory to a minimum. Store chemicals away from heat sources and direct sunlight.

Keep chemical inventories current when containers are disposed of, added, or replaced. When inventorying, track the size of the container, not how much it contains.

Segregate incompatible materials in storage:

- Acids away from bases in dedicated cabinets.
- Oxidizers away from organic compounds and flammable materials.
- Bleach away from ammonia.
- Water-reactive compounds away from alcohols, aqueous solutions, and sinks. • Flammable glacial acetic acid in the flammables cabinet, not the acid cabinet.
- Store concentrated sulfuric acid on a separate shelf in the acid cabinet away from concentrated hydrochloric acid.
- Store nitric acid in a secondary container in the acid cabinet.

d. Use of a chemical fume hood

Use the chemical fume hood for processes that may release hazardous chemical vapors, fumes or dusts. Use the hood when working with any volatile liquid or fine powders.

No chemical storage is allowed in the hood. Chemicals worked with in the hood should not block the flow of air. Provide secondary containment for all stored chemicals. Secondary containment must hold 100 percent of the largest container's capacity.

Keep the hood ventilation system running while chemicals are in it.

e. Working Alone

Experiments must not be conducted by an instructor or student working alone in a laboratory. There are no exceptions to this policy.

f. Dispensing Chemicals

When transferring chemicals from one container to another, be sure the new container is compatible with the chemical and is labeled with the name of the chemical. The label must have the date and name of the employee filling the container. Hazard warning statements on chemical labels are required. (Poison, corrosive, flammable, oxidizer, etc.)

8. Laboratory operations and activities requiring approval

a. These laboratory operations require review and prior approval by the Chemical Hygiene Officer:

- Non-routine procedures for which the employee or student has not been trained.
- Analytical work with an unknown substance.
- Disposal of chemical wastes, including evaporation or disposal in drains.
- Operations or activities for which there are no written procedures.
- Purchase of chemicals.

9. Emergency prevention and response

Laboratory instructors and other employees must be familiar with emergency procedures in order to prevent and reduce the impact of laboratory accidents.

a. Emergency procedures:

Emergency procedures should address chemical spills, laboratory accidents, a failure in the ventilation systems, and evacuation of the laboratory.

b. First aid:

Departments must have personnel trained in first aid available during working hours to render assistance until medical help can be obtained. All laboratory science personnel in the district are encouraged to possess a valid first aid card.

c. Emergency equipment:

The Safety Program Manager and Chemical Hygiene Officer must ensure that adequate emergency equipment is available in the laboratory and inspected regularly. (Refer to *Appendix 3. Science classroom and lab safety reference and checklist*)

d. Accident reports:

Carefully investigate all accidents and near accidents. Forward the results of this investigation and recommendations for the prevention of similar occurrences to the Safety Program Manager. Accident reports must be kept on file with the Safety Program Manager, chief building administrator and made available upon request.

10. Waste disposal

The Safety Program Manager and Chemical Hygiene Officer must ensure that laboratory chemicals are properly disposed of in a way that limits risk to human health and the environment.

a. Waste handling

Label chemical wastes with the words Hazardous Waste and the type of hazard it presents (e.g., Flammable, Corrosive, Toxic) on each container. Segregate waste chemicals based on their hazards in the same way that chemical products are stored in the stockroom. Once the hazardous waste collection container is mostly full, contact the Safety Program Manager and Chemical Hygiene Officer to arrange for proper disposal.

Unlabeled containers of chemical wastes are unacceptable. Ask instructors if they know what these containers may hold. Waste disposal companies cannot dispose of unknown materials, so their field chemist will have to test the contents. This is an expensive process that is avoidable in a well-run laboratory.

b. Waste disposal

Laboratory wastes must be properly disposed of. Before disposing of any laboratory waste materials, consult the Safety Program Manager for the

proper disposal method or procedure. Don't dispose of volatile organic compounds by evaporating them in a fume hood.

c. Treatment by generator

Some laboratory waste can be treated prior to disposal. All treatment activities must be tracked on a log sheet that shows the date, type, and amount of materials added to the treatment collection container. Use the log sheet found in *Appendix 5. Evaporation log sheet for treating aqueous metals solutions* to track this process.

Evaporate the water from aqueous metals solutions prior to disposal. Insert a large slide locking plastic bag into a large beaker. Label the large plastic container with the words "Hazardous Waste – Toxic Metals." Open the bag and fold the edges over the rim of the beaker. Place the beaker inside a secondary containment tray. Pour the metal-contaminated aqueous solution into the bag and let it evaporate.

As the liquid level drops, add more liquid. Eventually the bag will fill with dried sludge. Once the bag is mostly full, zip it closed and place the bag into a large plastic container with a tight-fitting lid. Then put a new bag in the beaker and repeat the process.

When the large plastic container is mostly full, attach the lid securely and dispose of it as hazardous waste. Once the hazardous waste collection container is mostly full, contact the Safety Program Manager and Chemical Hygiene Officer to arrange for proper disposal annually.
Be sure to keep the log sheet with the container to show exactly what it contains.

11. Training and Other Information

The Safety Program Manager and Chemical Hygiene Officer must have training provided for laboratory and other appropriate employees (e.g., receiving and shipping personnel, custodial, maintenance, stockroom personnel, emergency teams) including other information on the hazards of chemicals present in their work area and what to do if an accident occurs.

a. Training Program

Training must consist of at least these subjects:

- Procedures to follow to prevent the release of hazardous chemicals.
- Techniques for identifying a chemical release. The physical and health hazards of chemicals in the work area.

• Steps instructors can take to protect themselves and their students from chemical hazards, including general laboratory safety rules, emergency procedures and protective equipment to be used.

• Annual review of updated chemical hygiene plan components.

b. Information for employees

Employees must be provided with the following information:

• Location and availability of the Chemical Hygiene Plan.

• Permissible exposure limits (PEL's) for other hazardous chemicals where there is no applicable standard.

• Signs and symptoms associated with exposure to hazardous chemicals used in the laboratory.

• Location and availability of reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including Safety Data Sheets.

c. When to provide training and information

Information and training must be provided at the time of the employee's initial assignment to the work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Also, when there is annual updating of the chemical hygiene plan. Refresher information and training will be provided at least annually.

Students must receive general laboratory safety training at the beginning of each semester and whenever practice demonstrates a need. Specific safety procedures must be taught whenever the need dictates.

12. Inspections and reviewing the chemical hygiene plan

Safety inspections of the laboratory and annual review of the Chemical Hygiene Plan contributes to overall laboratory and employee safety. The Safety Program Manager must ensure that these procedures are followed in each department and by each Chemical Hygiene Officer.

Laboratory safety inspections must include all areas covered in *Appendix 3. Science classroom and lab safety reference*

Sample science lab safety check list:
https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.acs.org%2Fcontent%2Fdam%2Facsorg%2Fabout%2Fgovernance%2Fcommittees%2Fc

hemicalsafety%2Fhazard-assessment%2Ftable-f-1-traditional-laboratory-safety-checklist.docx&wdOrigin=BROWSELINK

a. Inspecting laboratory safety equipment

Inspect laboratory safety equipment at least semi-annually to ensure fitness for use, including:

• Fume hoods & other protective equipment (environmental controls).

• PPE (e.g., gloves, goggles, respirators).

• Emergency equipment (e.g., fire extinguishers, spill kits).

• First aid equipment (e.g., showers, eyewash stations). (See *Appendix 3. Science classroom and lab safety reference*.)

b. Review of the Chemical Hygiene Plan

The Chemical Hygiene Plan must be reviewed by the Safety Program Manager, Chemical Hygiene Officer, Hazardous Waste Coordinator, and others designated by the Safety Program Manager, at least annually for:

• Compliance with legal safety standards and better professional safety practices.

• Adequacy in protecting employees from the health and physical hazards associated with chemicals in use in the laboratory.

• The results of this review must be recorded, including notes on needed changes, and when those changes were made.

• The plan must be updated as necessary (e.g., when there are changes in laboratory operations, laboratory personnel, regulations, etc.) and in a timely manner.

D. General Laboratory Safety Rules

1. Goal

To protect the health and safety of laboratory instructors and students who work with hazardous chemicals through training and careful attention to safer operation practices.

2. General rules

The following pages contain the general laboratory safety rules for all school district laboratories. Other specific laboratory safety rules for individual laboratories can be added to these rules by the Chemical Hygiene Officer of that laboratory.

a. Know the safety rules and procedures that apply to the work at hand. Before beginning any new operation, determine the potential hazards and appropriate safety precautions to take.

b. Know the location and use of emergency equipment in the area, as well as ways to obtain additional help in an emergency. Be familiar with emergency procedures.

c. Know the types of protective equipment that are available and use the proper equipment for each job.

d. Watch out for unsafe conditions and report them so corrections can be made as soon as possible. One person's accident can be a danger to everyone in the lab area.

e. Consuming food or beverages in laboratories or areas where chemicals are being used or stored is prohibited.

f. Practical jokes or other behavior that might distract, startle, or confuse another worker can be dangerous and must be avoided.

g. Use equipment for its designed purpose only.

h. If you leave an operation unattended for any period of time, leave the laboratory lights on, post a sign, and take the necessary precautions for the event of a failure of a utility service (such as electricity or cooling water).

i. Never leave laboratory chemicals unattended in an unsecured room.

j. Notify the Chemical Hygiene Officer immediately if someone has been exposed to a hazardous chemical.

3. Chemical handling

a. Do not smell or taste chemicals.

b. Always add acid to water. Never add water to acid.

c. Know the hazards posed by the different classes of chemicals, including oxidizers, flammables, corrosives, reactives, compressed gases, acutely hazardous, and chronically hazardous chemicals.

d. Read and understand the Safety Data Sheet (SDS) before using any new chemical.

e. Chemical wastes must be disposed of properly. Consult with the Chemical Hygiene Officer about waste management prior to instituting a new laboratory experiment.

f. Be sure equipment is carefully secured before use. Combine reagents in the proper order, and avoid adding solids to hot liquids.

g. Never work alone in the laboratory. Make arrangements to have someone monitor your activities.

h. When transporting, storing, using, or disposing of any substance, be sure that it can’t accidentally come into contact with an incompatible substance. This contact could result in an explosion, fire, or the production of hazardous gases, fumes or vapors. See *Appendix 2. Storage pattern for chemicals where space is limited*.

4. Health and hygiene

a. Wear appropriate eye protection at all times in areas where chemicals are used or stored. Do not use contact lenses in the laboratory. Plastic contact lenses can absorb chemical vapors which may then cause serious eye damage.

b. Use protective apparel, including face shields, gloves, and other special clothing, as needed. Inspect gloves before each use, and replace them if they appear degraded or contaminated. Avoid contact between gloves and exposed skin, clothing, and eyes or mucous membranes during use.

c. Secure long hair and loose clothing to avoid accidents. Lab smocks or aprons are highly recommended. Wear clothing that covers the arms, legs and feet. Closed-toe shoes must be worn.

d. A pipette, pipette bulb, aspirator, or other mechanical device must be used to provide vacuum. Using the mouth to pipette chemicals or to start a siphon is not permitted for any laboratory procedure;

e. Avoid exposure to gases, vapors, and aerosols. Use the chemical fume hood when this type of exposure could occur.

f. Wash well with soap and water before leaving the laboratory. Chemicals on hands can be transferred to food.

5. Food handling

a. Do not be store, handle or consume food or beverages in the laboratory or other areas where chemicals are used or stored.

b. Do not bring chemicals or chemical equipment into areas that are designated for food consumption or smoking.

c. Never use laboratory glassware or utensils to prepare or consume food. Laboratory refrigerators, ice chests, microwave ovens and cold rooms must not be used for food storage or preparation. Laboratory refrigerators must have spark-proof motors to avoid setting off explosions of leaking vapors.

6. Housekeeping

a. Keep work areas clean and free from obstructions.

b. Cleanup should follow the completion of each operation and at the end of each day.

c. Attend to laboratory accidents and spills immediately. Follow the appropriate emergency procedures. The Center for Disease Control (CDC) has published

Emergency Procedures in Schools in the Event of a Chemical Spill at www.cdc.gov/niosh/docs/2004-101/append.html.

d. Keep chemical and waste containers labeled at all times. Inform the Chemical Hygiene Officer immediately of the presence of any unlabeled containers. Do not open unlabeled containers.

- Label chemical product containers with the name of the product that matches its SDS and its primary hazards (toxic, corrosive, reactive, flammable).

e. Never block access to exits, emergency equipment, controls, etc.

f. Notify the laboratory supervisor immediately if equipment malfunctions. Discontinue use of the equipment if a safety hazard exists.

g. Keep chemical storage under the hoods to a minimum. Leave the hood ventilation system turned on if chemicals are stored in or under the hood. Never store chemicals in fume hoods.

7. Glassware

a. Accidents involving glassware are the leading cause of laboratory injuries. Use careful storage and handling procedures to prevent glassware breakage.

b. Use adequate hand protection when inserting glass tubing into rubber stoppers or corks or when placing rubber tubing on glass hose connections. Tubing should be fire polished or rounded and lubricated. Hold hands close together to limit movement of glass should a fracture occur.

c. Handle vacuum-jacketed glass apparatus with extreme care to prevent implosions. Only glassware designed for vacuum work should be used for that purpose.

d. Wear protective gloves when picking up broken glass. Wear disposable chemical-resistant gloves under durable gloves when handling contaminated glass shards. Sweep up small pieces with a brush and dustpan.

8. Flammability hazards

a. Never use an open flame to heat flammable liquids. Extinguish open flames as soon as its purpose is served.

b. Before lighting a flame, remove all flammable substances from the immediate area and check all containers of flammable substances to ensure they are tightly closed.

c. Store flammable materials in a flammable storage cabinet or other appropriate location.

d. Make sure that all flammable cabinets and containers are properly grounded to prevent accidental ignition of flammable vapors and liquids from static electricity or other sources of ignition.

e. Flammable cabinets must be kept closed or provided with ventilation piping that leads directly outside and is equipped with an explosion-proof exhaust fan.

E. Specific Exposure Control Measures

1. Goal:

To reduce instructor or student exposure to hazardous chemicals through unique exposure control measures.

2. Criteria:

Three situations may require unique specific exposure control measures:

a. Use of Ban Candidate or other high-hazard chemicals.

b. Experimental procedures that increase the risk of harmful exposures.

c. Procedures that could exceed the capacity of protective equipment or practices.

3. Chemicals of special concern

Purchase of chemicals listed in *Appendix A. Ban Candidate Chemicals* is prohibited without written authorization from the Safety Program Manager.

Follow these guidelines when working with the chemicals listed below to avoid exceeding the PELs:

a. Cadmium

- Cadmium compounds are carcinogenic. Purchase and use of cadmium compounds is prohibited.

b. Chromium - hexavalent

- Hexavalent chromium compounds (chromate compounds, dichromate compounds, and chromium trioxide) are carcinogenic. Minimize the use of these compounds and the amount kept in storage.
- Use of hexavalent chromium compounds is discouraged. If they must be used, buy the smallest amount necessary and only use them in the fume hood while wearing chemical resistant gloves.

• Purchase hexavalent chromium compounds pre-diluted to reduce the risk of dust formation.

c. Lead

• Lead compounds are neurotoxic by ingestion and inhalation.

• Only open powdered lead compounds in chemical fume hoods.

• Purchase lead compounds pre-diluted to reduce the risk of dust formation.

d. Methylene chloride

• Methylene chloride is a probable carcinogen that is highly volatile, easily inhaled and absorbs into the bloodstream through unprotected skin.

• Use of methylene chloride is discouraged. If it must be used, buy the smallest amount necessary and only use it in the chemical fume hood while wearing chemical-resistant gloves.

e. Mercury compounds and apparatus

• Secondary schools should not have elemental mercury, mercury compounds, mercury novelty items, mercury thermometers or mercury-containing sphygmomanometers.

4. Exposure potential

The primary routes of exposure to chemicals are by inhalation, ingestion, and contact with skin or eyes.

a. Inhalation of chemical vapors, mists, gases, fumes or dusts can produce poisoning through the mucous membrane of the nose, mouth, throat, and lungs and can seriously damage these tissues. The degree of injury resulting from exposure depends on the toxicity of the material, its solubility in tissue fluids, its concentration and the duration of exposure.

b. Ingestion of many chemicals can be extremely dangerous. Some are poisonous in small doses while others can cause health problems from long-term low-level exposures. Many chemicals will also directly damage the tissue of the mouth, throat, nose, lungs, and gastrointestinal tract.

c. Contact with skin and eyes can lead to significant chemical injury. Skin contact frequently will cause local irritation, but many chemicals can be absorbed through the skin and cause systemic poisoning. Most chemicals are damaging to the eyes, which are very sensitive organs. Alkaline materials like hydroxides, phenols, and strong acids can cause permanent loss of vision.

Chemicals that are highly volatile or prone to corrode their container's caps increase the risk of harmful exposures. Find out whether staff or students have particular sensitivities to any chemical. Risk factors include asthma, chemical sensitivities, pregnancy and compromised immune systems. These factors must be considered when determining the amount of time, a person should be working with a specific chemical compound.

5. Exposure controls

Check the need for exposure controls when staff handle chemicals or use lab procedures. Include a review of existing engineering controls, administrative practices and PPE.

Make sure ventilation systems provide protection for employees from chemical exposures. For example, use a chemical fume hood when procedures generate smoke, dust, fumes, or vapors.

Provide training to ensure employees are adequately protected from overexposure to hazardous chemicals. Keep track of the chemicals being used in experiments and demonstrations. Higher hazard chemicals require a higher degree of protection from harmful exposures. Use this information to decide if medical monitoring is needed.

Choose the right PPE for the compounds you are using. Before working with hazardous chemicals, ask the Chemical Hygiene Officer what type of PPE is necessary. Receive training in proper use and maintenance of PPE prior to using it – especially respirators.

These measures include the establishment of designated areas, use of containment devices, decontamination procedures and safe removal of contaminated waste.

Decontamination procedures

The Chemical Hygiene Officer and Hazardous Waste Manager shall develop procedures for decontaminating chemical usage areas in the laboratory. Decontaminate contaminated equipment and glassware in the hood before moving them. Decontaminate fume hoods after use and always before resuming normal work.

Procedures for handling reproductive toxins

Examples: Lead, cobalt and nickel compounds, formaldehyde, ethidium bromide.

a. Only handle dry forms of these substances in a fume hood.
b. Use gloves and other protective clothing to prevent skin contact.

c. Always wash hands and arms immediately after working with these materials.

d. Keep records of the amounts of these materials on hand, amounts used, and the names of the workers using them.

e. Train employees in emergency procedures for accidents or spills involving these substances. Notify the Chemical Hygiene Officer of all chemical exposures or spills.

f. Store containers of these substances in a well-ventilated area and label them properly.

Procedures for handling chemicals with high acute toxicity

Examples: Fluoride compounds, nitric acid, bromine, phenol.

a. Seek safer alternative compounds for use in experiments.

b. Use and store these substances in restricted access areas with warning signs.

c. Always use a hood when working with concentrated forms of these substances.

d. Always wash your hands and arms immediately after working with these materials.

e. Keep records of the amount on hand, the amount used, and the names of the workers using them.

Procedures for handling select carcinogens

Examples: Formaldehyde, perchloroethylene and chromate, nickel, cobalt and cadmium compounds.

a. Seek safer alternative compounds for use in experiments.

b. The use and disposal of these substances should be approved by the Chemical Hygiene Officer prior to this activity.

c. Use and store these substances in areas of restricted access with special warning signs.

d. Always use a hood when working with concentrated forms of these substances.

e. Always wash your hands and arms immediately after working with these materials.

f. Keep records of the amounts on hand, the amounts used, and the names of the workers using them.

F. Inspection and Plan Review

1. Goal:

To develop a well-organized laboratory inspection program which allows the Chemical Hygiene Officer to identify and correct the cause of chemical exposures before they occur. The objectives of this inspection program are to:

a. Generate and maintain a high level of prevention consciousness.

b. Educate staff and students in the merits and methods of detecting and eliminating hazardous situations.

c. Demonstrate the school district's interest in the protecting the health and safety of staff and students.

d. Foster a better understanding of the responsibilities that each must assume in the prevention of accidents.

e. Help determine where additional training or instruction may be required.

f. Develop a Chemical Hygiene Plan review process that evaluates the plan's effectiveness and identifies the need for updates.

Inspection procedures

Refer to *Appendix 3. Science classroom and lab safety reference*. This checklist provides information on the recommended and required environmental health and safety components of a well-functioning laboratory.

See www.hazwastehelp.org/educators/labchecklist.aspx.

Emergency, first aid and PPE

Inspect safety equipment every six months to ensure it is functioning properly and that there are adequate supplies. Note and promptly correct deficiencies.

Review of the Chemical Hygiene Plan

The effectiveness of the Chemical Hygiene Plan must be reviewed and evaluated at least annually and updated if necessary. Factors to consider in the review include:

a. Changes in laboratory procedures, operations or equipment that may affect the potential for personal exposure to hazardous chemicals.

b. The addition or deletion of the use of specific hazardous chemicals that warrant a review of laboratory safety procedures.

c. Changes in laboratory personnel or their responsibilities.

d. The review and evaluation of inspection records, accident investigations, and professional research on chemical hygiene techniques.

G. Employee Information and Training

1. Goal

To provide information and training about the hazards of chemicals present in the Laboratory.

Information requirements

Laboratory employees must be provided with specific information on the chemicals used in their work areas.

Employee training requirements

Employees must be trained on the potential chemical hazards in their work areas and on appropriate sections of the Chemical Hygiene Plan.

Who should be trained

Provide this training to all employees who work in the laboratory as well as to other employees whose assignments may require that they enter a laboratory where exposures might occur, such as maintenance and custodial personnel. Inform employees who are responsible for receiving and handling shipments of new chemicals or chemical wastes about the potential hazards and appropriate protective measures for chemicals they may receive. Students should also receive training appropriate to their level of chemical handling and potential exposure.

Record-keeping

Document training of laboratory personnel and keep it in the employee's file.

Information and training frequency

The laboratory standard requires that employees receive information and training at the time of their initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Refresher training and information must be provided at least annually.

Information program

Laboratory employees must be informed of at least the following information:

a. The location and availability of the Chemical Hygiene Plan.

b. The PEL's for regulated substances (see SDSs) and/or recommended exposure limits for other hazardous chemicals.

c. Signs and symptoms of exposure to hazardous chemicals used in the laboratory.

d. The location and availability of known reference materials on the hazards, safer handling, storage and disposal of hazardous chemicals found in the lab including Safety Data Sheets received from the chemical suppliers.

H. Exposure Monitoring and Medical Attention

1. Goal

To provide laboratory instructors, other laboratory employees, and students with an appropriate level of exposure monitoring, and medical attention to protect them from adverse health effects resulting from potential exposure to hazardous chemicals.

Exposure monitoring

The laboratory standards for exposure monitoring are summarized on the following pages. The Safety Program Manager or Chemical Hygiene Officer must maintain records of exposure monitoring, including the test method and results. Keep employee exposure monitoring records in the employee's file.

If there is reason to believe that exposure levels for a regulated substance routinely exceed the action level (or in the absence of an action level, the PEL), employee exposure to that substance must be measured.

a. Initial exposure determination

This is a list of common situations that increase the risk of employee exposures. • Laboratory operations using hazardous chemicals in a way that increases releases. • Past data that shows elevated exposures to the particular substance for similar operations. • Procedures that use large volumes of hazardous chemicals.

• Procedures that use hazardous chemicals over a long period of time.

• Employees with exposure symptoms like skin irritation, difficulty breathing, nausea, or headache.

None of these conditions should exist in middle or high school laboratories.

b. Exposure monitoring when the action level is exceeded

If an exposure determination exceeds a substance's PEL, the school district must follow the substance's exposure monitoring requirements. Monitor airborne concentrations of individual hazardous chemicals in these circumstances:

• When testing or redesigning the hoods and other local ventilation devices. • When a specific substance that is toxic or highly toxic is regularly and continuously used.

• When requested by a laboratory employee because of a documented health concern or suspicion that a PEL may be exceeded.

c. Exposure record-keeping

Send exposure testing procedures and results to the Safety Program Manager for coordination and record maintenance.

The employee must be notified of any monitoring results within 15 working days of receiving the results, either individually or by posting the results in an appropriate location that is accessible to employees, such as the safety bulletin board.

Accurate records of measurements taken to monitor employee exposures must be kept, transferred and made available for each employee.

Medical attention

Medical examinations are to be provided at no cost to the employee. The Safety Program Manager must maintain an accurate record for each laboratory employee undergoing medical consultations or medical examinations as required by the laboratory standard. Keep this information in an employee's file:

a. Exposure monitoring test methods and results.

b. Safety Data Sheet of the hazardous chemical(s) involved.

c. Accident Report.

d. Information submitted to, and received from, the physician.

Medical consultations and medical exams

Employees who work with hazardous chemicals must be provided with an opportunity to receive medical attention when overexposure to a hazardous chemical is suspected.

a. Medical attention must be provided to an employee under the following circumstances:

• Employees showing symptoms of chemical exposure must be permitted to receive a medical examination.

• When exposure monitoring reveals an exposure level routinely above the substance's action level, medical surveillance must be conducted as required by the laboratory standard.

• Whenever a spill, leak or other event makes it likely a hazardous exposure has occurred, the affected employee must be provided with the opportunity for medical consultation to determine the need for a medical exam.

b. Type of medical attention

All medical examinations and consultations must be performed under the direct supervision of a licensed physician without cost to the employee, without loss of pay and at a reasonable time and place. Direct all questions regarding medical consultations and examinations to the Safety Program Manager.

c. Information for the physician

Provide the following information to a physician conducting medical consultations and exams:

- The identity of hazardous chemicals to which the employee may have been exposed.
- A description of the conditions under which the exposure occurred, including quantitative exposure data if available.
- A description of the signs and symptoms of exposure that the employee is experiencing, if any.

d. Physician's report

A written opinion from the examining physician for any consultations or exams performed under this Operating Procedure must include:

- Any recommendations for further medical follow-up.
- The results of the medical examination and any associated tests.
- Any medical condition revealed during the course of the exam which might compromise employee safety during, or as a result of, exposure to hazardous chemicals found in the workplace.
- A statement that the employee has been informed by the physician of the results of the consultation or medical exam and any medical condition that may require further examination or treatment.

The written opinion should not reveal specific diagnoses unrelated to occupational exposure, except as noted above.

e. Medical record-keeping

Accurate records of medical consultations or medical examinations must be kept by the Safety Program Manager. Records for each employee must be transferred and made available.

Provisions equal to the above must be extended to affected students when an overexposure situation occurs. Application of the specific provisions related to student medical records, method of payment for physician

services, etc., will vary according to student safety requirements and school district policies.

APPENDICES

Appendix 1. Hazardous chemicals:

Working with Allergens and Embryotoxins and Highly Toxic Materials

Since the department is not equipped to handle highly toxic materials and proper safeguards cannot be provided in a laboratory situation, staff should not work with allergens (or potential allergens), embryotoxins or with chemicals of moderate chronic or high acute toxicity.

Some specific recommendations:

I. The following chemicals are listed as known or probable carcinogens and should not be used in the science department:

Arsenic powder CAS 7440-28-2
Arsenic Pentoxide CAS 1303-28-2
Arsenic Trichloride CAS 7784-34-1
Arsenic Trioxide CAS 1327-53-3
Asbestos CAS 1332-21-4
Benzene CAS 71-43-2
Benzidine CAS 92-87-5
Chromium powder CAS 7440-47-3
Chromium (VI) Oxide CAS 1333-82-0
Lead Arsenate CAS 7784-46-5
Sodium Arsenate CAS 7631-89-2
Sodium Arsenite CAS 7784-46-5
4-Nitrophenyl CAS 92-93-3
Methyl Chloromethyl Ether CAS 107-30-2
3,3'-Dichlorobenzidine CAS 91-94-1
4-Aminodiphenyl CAS 92-67-1
Beta-Propiolacetone CAS 57-57-8

4-Dimethylaminoazobenzene CAS 60-11-7
Vinyl Chloride CAS 75-10-4
Alpha-Napthylamine CAS 134-32-7
Beta-Naphthylamine CAS 91-59-8
Ethyleneimine CAS 151-56-4
2-Acetylaminofluorine CAS 53-96-3
N-Nitrosodimethylamine CAS 62-75-9
4,4-Methylenebis
(2-dichloraniline) CAS 101-14-4
Bis-chloromethyl Ether CAS 542-88-1
Acrylonitrile CAS 107-13-1
Cadmium powder CAS 7440-43-9
Cadmium Chloride CAS 10108-64-2
Cadmium Sulfate CAS 10124-36-4
Carbon Tetrachloride CAS 56-23-5
Chloroform CAS 67-66-3
Ethylene Oxide CAS 75-21-8
Nickel Powder CAS 7440-02-0
0-Toluidine CAS 95-53-4

2. The following chemicals are explosive and should not be used in the science laboratories:

Benoxyl Peroxide CAS 95-36-0
Carbon Disulfide CAS 75-15-0
Diisopropyl Ether CAS 108-20-3
Picric Acid CAS 88-87-1
Perchloric Acid CAS 7601-90-3

3. The following chemicals have properties which are hazardous because they are either skin absorbent, have toxic vapors, are time sensitive, or are highly reactive. If they are used in the laboratory special precautions recommended by the manufacturer should be followed.

Methyl Alcohol CAS 67-56-1
Ethyl Ether CAS 60-29-7
Mercury CAS 7439-97-6
Sodium CAS 7440-23-5
Potassium CAS 7440-09-7
Potassium Chlorate CAS 3811-04-9
Ammonium Dichromate CAS 7789-09-5
Ammonium Nitrate CAS 6484-52-2
Hydrogen Peroxide CAS 7722-84-1

Calcium Carbide CAS 75-20-1
Hydrogen Sulfide CAS 7783-06-4
Chlorine CAS 7782-50-5
Bromine CAS 7726-95-6
Iodine CAS 7726-95-6
Phenylthiocarbamide (PTC) CAS 7553-56-2
Formaldehyde CAS 50-00-0

4. Allergens: Pollen, mold, fungi, latex, peanuts

Any solvent with a flash point below 140 degrees Fahrenheit (60 degrees Celsius).

This list is not all inclusive. For a specific chemical not listed above check the references available in the science office.

Appendix 2.
Storage Pattern for Chemicals Where Space is Limited

A proper chemical storage system separates materials according to chemical compatibility and hazard class. Many schools try to use the excellent chemical storage system found in Flinn Scientific's catalog. Unfortunately, many school stockrooms are too small to provide 23 separated locations for classes of chemicals.

Here are some tips for creating safer chemical storage rooms:

- •Complete an inventory of the chemical compounds in each stockroom.
- •Do not store chemical containers above eye level if possible.
- •Separate inorganic compounds from organic compounds. • Store solids above and liquids below. • Storage cabinets for acids, bases and flammables are meant for liquids, not dry solids.
- •Vent acid cabinets to prevent vapor build-up.
- •Store concentrated sulfuric acid on one shelf of the acid cabinet and concentrated hydrochloric acid on another.
- •Store nitric acid in a secondary container with other inorganic acids or a separate cabinet.
- •Do not vent flammable liquid storage cabinets unless you're using an explosion-proof fan that is carrying the vapors out of the building.
- •Glacial acetic acid is a flammable liquid; store it in a dedicated organic acid cabinet or in the flammable liquids cabinet.
- •Flammable liquids like alcohols must not be stored in conventional refrigerators.

The chart below combines categories of chemicals that have similar hazardous characteristics. By doing so, you will only need 12 separate storage locations.

<table>
<tr><td colspan="2">Inorganic Reactives & Metals (I-1, I-10)
Organic Toxins (O-5, O-7)
Sulfur, Phosphorus (double packaged), Arsenic,
Epoxy Compounds, Isocyanates, Sulfides,
Solid Metals, Hydrides, Lithium, Sodium
Polysulfides</td></tr>
<tr><td>Inorganic Salts (I-2)
Chlorides, Iodides, Fluorides, Bromides, Sulfates, Sulfites Thiosulfates, Phosphates</td><td>Organic Reactives #6
Peroxides, Azides, Hydroperoxides</td></tr>
<tr><td>Inorganic Oxidizers (I-3, I-6, I-8)
Nitrates, Nitrites, Borates, Chromates, Manganates, Permanganates, Chlorates, Chlorites, Peroxides, Azides</td><td>Flammable Storage Cabinet (O-2, O-3, O-4, O-8 & Concentrated Organic Bases)
Alcohols, Glycols, Phenol, Hydrocarbons, Cresols, Esters, Ethers, Propionic Acid, Formic Acid, Glacial Acetic Acid, Lactic Acid</td></tr>
<tr><td>Inorganic Corrosive Bases (O-4) (Dry Chemicals)
Dry Hydroxides, Oxides, Silicates, Carbonates, Carbon</td><td>Dry and Dilute Organic Acids & Anhydrides (O 1)
Citric Acid, Anhydrides, Peracids, etc.</td></tr>
</table>

<table>
<tr><td colspan="2">Inorganic #5 and #7 Toxins
Miscellaneous
Arsenates, Cyanides, Sulfides, Selenides,
Household chemicals (vinegar, baking soda,
Phosphides, Carbides, Nitrides
vegetable oils), Dyes, Stains, Agars, Sugars, Gels</td></tr>
<tr><td>Corrosive Base Storage Cabinet (I-4 Liquids) >1.0 molar Ammonium Hydroxide, Sodium Hydroxide, Calcium Hydroxide (limewater), Potassium Hydroxide, Oxides, Silicates</td><td>Non-metal Corrosive Acid Storage Cabinet (I-9 Liquids)
Hydrochloric Acid, Sulfuric Acid, Hydrobromic Acid, Phosphoric Acid, Perchloric Acid. Nitric acid separately stored in this or another cabinet. Limit Nitric Acid to a 5-year supply.</td></tr>
</table>

Dilute solutions at or below 1.0 molar can be stored on shelves rather than in cabinets. Segregate inorganic and organic compounds. Check containers annually for condition of containers, labels and contents. Replace degraded lids, dropper tops and solutions.	*To prevent release of corrosive vapors, avoid storing pipettes holding acids or bases in test tubes taped to the side of bottles. Wrap fritted glass stoppers on acid bottles in parafilm to reduce evaporation. Store Iodine crystals in a sealed plastic bag to monitor degradation of the container's cap and reduce indoor air pollution.*

Appendix 3.

Science Classroom & Lab Reference for Environmental, Health and Safety Guidance

(Abbreviations defined below)	Required	Recommended	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Containers of non-hazardous substances (e.g., distilled water) shall be labeled to avoid confusion. (All containers must be labeled regardless of the contents).	**X**		
• A mercury barometer is allowed, but not recommended. Mercury shall be disposed of in compliance with EPA and ECY regulations. Mercury-free barometers are available, e.g.: the "Eco-Celli" barometer.		**X**	
• Formaldehyde should not be in K-12 schools. Laboratories using formaldehyde solutions must comply with the OSHA Occupational Standard for Formaldehyde. Biology specimens stored in formaldehyde should be decanted and held in a formaldehyde-free alternative. e.g., Flinnsafe, Carosafe, propylene glycol, or alcohol solution.		**X**	

Formaldehyde disposal shall adhere to the ECY Dangerous Waste Regulations.			
• Glassware should be free of all cracks, chips, sharp edges and other defects.		X	

(Abbreviations defined below)	Required	Recommended	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Biology specimens should be stored in sealed containers to prevent evaporation of liquid contents and resulting IAQ issues. Specimens preserved in hazardous or dangerous chemicals, e.g., alcohol, should be stored in locked cabinets. A flammable cabinet may be required.		X	
• All laboratories shall have a written clean-up plan for spills. All laboratories shall have a spill clean-up kit or materials for absorbing spills identified and readily available to students and staff.	X		
• Waste shall be disposed in accordance with ECY regulations. No waste or chemicals shall be poured down the drain or put in the garbage without approval from local sewer or solid waste authorities.	X		
• Instructors shall wear PPE when using corrosive, toxic, reactive, or irritating chemicals and during hazardous activities.	X		
• Fume hood shall be used when using known or suspected carcinogens, mutagens, teratogens, and chemicals which are fast acting/highly toxic, listed as toxic via skin absorption or inhalation, or chemicals with a TLV or PEL of 50 ppm or less. This determination shall be based on information provided by material? (MSDS or SDS) safety data sheets.	X		

• Eye protection, safety glasses, and face shields shall meet ANSI requirements... Students shall wear PPE when using corrosive, toxic, reactive, or irritating chemicals and during hazardous activities.	X		
• A sink with soap and paper towels shall be available in the lab for hand washing.	X		

(Abbreviations defined below)	Required	Recommended	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Emergency eyewash and shower stations shall be provided when there is a potential for exposure to corrosives, strong irritants or toxic chemicals. They shall be located within 50 feet or ten seconds walking distance from all lab science work stations.	X		
• Emergency showers shall deliver water to cascade over the user's entire body at a minimum rate of 20 gallons (75 liters) per minute for 15 minutes or more.	X		
• Eye-wash stations and emergency showers shall be handicap accessible and operable "hands-free" so that the user can hold both eyes open. .	X		
• Eye wash stations shall provide 0.4 gallons (1.5 liters) per minute for 15 minutes or more. In some areas with high water pressure, flow regulators may be required on the eye wash stations.	X		
• Emergency showers and eye wash units shall be tested for proper operation annually. Plumbed emergency eye washes must be activated weekly. Written documentation of tests shall be maintained on site.	X		
• Fire retardant lab coats shall be used when appropriate for a specific project or demonstration.	X		
• A first aid kit shall be provided and adequately stocked in the lab area.	X		

• Appropriate gloves, matched to the hazard, shall be provided and worn when the potential for hand contact with chemicals exists.	X		

(Abbreviations defined below)	Required	Recommended	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Closed toe shoes shall be worn at all times in the laboratory. (No sandals or perforated shoes.)	X		
• A non-asbestos fire blanket should be provided, identified, readily available, and visible to students and staff.		X	
• Safety shields on the demonstration table should be used for demonstrations wherever the possibility of explosion exists.		X	
• Ethidium Bromide is hazardous via skin contact or ingestion. Gloves and eye protection shall be worn when handling it. Only purchase Ethidium Bromide in kits and, when done using it, dispose as toxic hazardous waste.		X	
• Jewelry should not be worn if personal safety would be jeopardized.		X	
• Loose hair should be restrained so that personal safety is not jeopardized.		X	
• There shall be an on-demand, mechanical ventilation system providing additional air exchange as required by codes for chemical areas such as photo darkrooms, storerooms and chemistry labs. (This is in addition to the building HVAC system).	X		
• All hazardous chemical fumes and vapors shall vent directly to the outside to prevent return into the building or the building HVAC system.	X		

(Abbreviations defined below)	Required	Recommended	Inspection Checklist: Check if compliant. Report problems to administration.
• Make-up air shall be of ample quantity to replace the exhausted air and shall be tempered when necessary.	X		
• Only UL approved heating devices shall be used in laboratories.	X		
• Electrical receptacles shall be properly grounded. GFI devices shall be provided on all electrical receptacles within six (6) feet of sinks and other grounding sources.	X		
• All electrical equipment shall be properly grounded. Portable electrical equipment shall be double-insulated or provided with a UL-listed ground prong.	X		
• Electrical extension cords shall be UL-listed, and the wire size shall be appropriate for the applied use.	X		
• There shall be at least one fume hood for each laboratory where hazardous chemicals are used. A demonstration hood is also recommended with clear sides so students can view demonstrations from three sides.	X		
• All fume hoods shall exhaust directly to the outside, away from all occupied areas and air intakes in order to prevent exhaust from reentering the building.	X		
• Fume hoods in school buildings shall comply with AHERA asbestos regulations.	X		
• All electrical devices such as switches, lights and motors used in the fume hood shall be explosion-proof.	X		

(Abbreviations defined below)	Required	Recommended	Inspection Checklist: Check if compliant. Report problems to administration.
• Electrical panel circuit breaker switches for the lab shall be accessible and the breakers labeled. A clear and unobstructed means of access with a minimum width of 30 inches and a minimum height of 78 inches shall be maintained from the operating face of an electrical panel board.	X		
• Fire extinguishers (ABC type) shall be provided. Fire extinguisher (D type) is required for combustible metals. Fire extinguishers shall be identified and readily accessible to staff and students. The instructor shall be trained in fire extinguisher use. Demonstration or hands-on training shall be provided during safety orientation.	X		
• A fire alarm system shall be provided. Alarm pull stations shall be identified and readily accessible to staff and students.	X		
• Master gas shut-offs shall be provided, the location clearly visible, accessible, and indicated by means of a sign. Master electricity and water shut-offs are recommended. Directional signs should be provided to safety items in all lab areas.	X		
• Fume hood air velocity should be 60-125 LFM checked quarterly with a velocity meter. Written documentation of all tests should be maintained on site. The exhaust capture path should direct contaminants away from the user. With the sash raised to 12 inches, the air flow should measure at least 60 LFM.		X	
• Chemicals shall be organized and stored to separate incompatible groups. Labels shall clearly denote the identity of the container's chemical contents, warnings about its health and physical hazards, and the date received.	X		

(Abbreviations defined below)	Required	Recommended	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Food items (for human consumption) shall not be permitted in chemical laboratories or storerooms (including lab refrigerators). No eating, drinking or gum chewing shall be allowed in labs to prevent poisoning through ingestion. All food items to be used for experiments shall be labeled "Not for human consumption."	X		
• Chemical storerooms shall be lockable and inaccessible to unsupervised students, and have self-closing doors. Doors shall have a one-hour fire rating.	X		
• Chemicals marked only with teacher codes (e.g., A, B, C,), for student testing/analysis, shall not be allowed in permanent storage. All containers shall be stored in a way that allows identification of their contents.	X		
• All flammables shall be stored in approved flammable storage cabinets with self-closing doors. Flammables (red labels) and acids and bases (white labels), shall be stored separately. Fire departments recommend not venting flammables cabinets.	X		
• Elemental mercury, mercury thermometers, mercury compounds and other mercury-containing devices shall not be in schools.	X		
• Only explosion-proof refrigerators shall be used to store volatile chemicals. Non-explosion-proof refrigerators or other electrical devices shall not be located in areas with vaporous or flammable chemicals.	X		
• Chemicals should not be stored in fume hoods for over 24 hours.		X	

(Abbreviations defined below)	Required	Recommended	**Inspection Checklist:** Check if compliant. Report problems to administration.
• There should be a separate storage shelf, cabinet or area for water reactive compounds (e.g., metallic sodium, potassium or calcium) and organic peroxides.		**X**	
• Chemical storage areas should be clean, well-organized and have sufficient space to allow segregation of incompatible chemicals and easy access to storage shelves and exit doors.		**X**	
• Chemical storerooms should have sturdy, well-supported shelves secured to the walls. All shelves should have "earthquake" (or "spill prevention") lips on all shelf edges. Doors that close on cabinets do not replace the need for spill-containment "lips" on the front edge of shelves.		**X**	
• Chemical storerooms should have all hazardous chemicals stored at or below eye level (typically below 5' 6") with heavy objects stored on lower shelves. Higher shelves may be used for other items; e.g. glassware, equipment, paper goods, etc.		**X**	
• Chemical storage areas should be kept cool (between 55- and 80- degrees F) and dry (relative humidity between 30 and 60%).		**X**	
• Chemicals should be stored according to their properties, in compatible storage groups, not alphabetically.		**X**	
• All acids should be stored in approved acid cabinets. Isolate flammable acids like glacial acetic acid from oxidizing acids like nitric and sulfuric acid. Non-metal cabinets are recommended to prevent corrosion of the cabinet. Vent acid cabinets to prevent build-up of hazardous vapors.		**X**	

(Abbreviations defined below)	Required	Recommended	**Inspection Checklist:** Check if compliant. Report problems to administration.
• The chemical hygiene officer (e.g., science department chairperson or science teacher) shall develop and carry out a written CHP. It should include an operation and maintenance program for laboratory fume hoods and other mechanical equipment in science laboratories.	**X**		
• A written and documented lab safety orientation that includes components of the Chemical Hygiene Plan shall be provided for all staff and students.	**X**		
• A telephone for reporting emergencies shall be located in or near the laboratory. Emergency telephone numbers shall be readily accessible. Staff shall be trained in emergency procedures.	**X**		
• Lab floor plans shall be kept in the school office. A listing of exits, chemicals, and storage place of chemicals shall be included for use by emergency responders. Exits shall be clearly marked and free of obstruction.	**X**		
• Science laboratories shall have an inventory list of all chemicals. This list must be updated periodically. (The recommendation is annually or more frequently.)	**X**		
• SDS shall be kept and readily available for all chemicals in the lab.	**X**		
• Science laboratories shall have a written CHP that is available to all students and staff members. It shall be reviewed annually and updated when necessary. (New science teachers shall review the CHP as part of their Employee Safety Orientation.)	**X**		

(Abbreviations defined below)	Required	Recommended	Inspection Checklist: Check if compliant. Report problems to administration.
• Invisible hazards (radiation, chemical, electrical, laser, and heat) should be posted with warning signs or symbols when present.		X	
• Schools should only store and use chemicals appropriate for their level of science instruction. The Local Hazardous Waste Management Program in King County maintains a comprehensive database of school chemicals which includes exposure hazards environmental toxicity, common experiments, grade suitability, and a grade-based hazard rating. Chemicals in the data base rated as “ban candidates” should not be used in K-12 schools.		X	
• Chemicals should be purchased in the smallest commercially available container or in an amount that will meet the school's needs for approximately five academic years, whichever is greatest. All chemicals should be dated upon receipt into the lab or storage area.		X	
• CDC/NIOSH/USCPSC School Chemistry Laboratory Safety Guide is available on-line.			

APPENDIX 4 Guide to Abbreviations and References

AHERA – Asbestos Hazard Emergency Response Act

ANSI/ISEA – American National Standards Institute
ANSI/IEEE C95 – Standard for Radio Frequency Energy and
Current Flow Symbols ANSI/ASSP Z9.5 – Laboratory Ventilation
and Decommissioning Package
ANSI/ISEA Z87.1 – Standard for Occupational and Educational Eye and Face
Protection Devices ANSI/ISEA Z358.1 – Emergency Eyewash and Shower
Equipment

ASHRAE – American Society Heating Refrigeration Air Conditioning Engineers

CFR - Codes of the Federal Register
29 CFR 1910.132 – Personal Protective Equipment
29 CFR 1910.141 – Chemical Hygiene in Laboratories
29 CFR 1910.307 – Electrical
29 CFR 1910.1048 –Formaldehyde Standard
29 CFR 1910.1200 –Hazard Communication Standard
29 CFR 1910.1450 –Lab Standard

CDC – Centers for Disease Control and Prevention

CHP – Chemical Hygiene Plan

EPA – Environmental Protection Agency

GFI - Ground fault interrupter

L & I – Labor and Industries

LFM – Linear feet per minute

HVAC – Heating, ventilation and air conditioning

IAQ – Indoor air quality

IFC - International Fire Code
IFC 605 – Electrical
IFC 2701 – Performance Standards
IFC 2703 – General Safety Precautions

IMC - International Mechanical Code and state Building Code
IMC 51-52 –

MSDS - Material Safety Data Sheets

NFPA - National Fire Protection Association
NFPA 70/NEC 110 – National Electrical Code

NIOSH – National Institute for Occupational Safety and Health

PEL - Prudent Practices - Prudent Practices in the Laboratory – National Research Council **TLV –** Threshold limit value
UL – Underwriters' Laboratories

UPC - Uniform Plumbing Code
51-56 UPC – Uniform Plumbing Code

USCPSC - United States Product Safety Commission

Appendix 5 First-Aid

Science laboratories generally make use of corrosive materials, projectiles, glass and other potential sources of injuries.

Safety incidents requiring first-aid or first responder training for science teachers working in school laboratories include:

1. **Heat/Chemical Burns**: Chances are good that someone will get burned in the laboratory from Bunsen burners, matches, ring stands, hotplates, etc. Should that happen, immediately soak the burned area in cold water. Request immediate assistance from the school's health care provider.

2. **Electrical Burns**: Severity of the burn depends on the type, amount and length of contact. The electrical incident may also cause the heart to stop or beat erratically. Respiratory arrest may also occur. Signs of electrical injury include – unconsciousness, dazed, confused behavior, breathing difficulty, obvious burns on the surface of the skin, weak, irregular or absent pulse, burns both where the current entered and where it exited. You can also suspect a possible electrical injury if a sudden low noise such as a pop or bang is heard. An unexpected flash of light may also indicate an electrical incident. If the teacher is trained or certified in CPR, initiate emergency care.

Otherwise, request immediate assistance from the school's health care provider.

3. **Bleeding**: Bleeding can occur as a result of cuts from glass, metal, scalpels and other sharp objects. In situations where arterial bleeding occurs, prompt action is required. Direct pressure over the wound with use of a barrier such as a rubber glove. If a glove is not handy, use a shoe with the hand inside of it. The barrier is needed as a standard precaution. Request immediate assistance from the school's health care provider.

4. **Chemical Exposure**: With an increased emphasis on hands-on, process and inquiry-based science, chemical exposure has a heightened probability of happening. Be certain to have the SDS available for each hazardous chemical used and review it prior to any laboratory work being done. Should there be an exposure, have the injured person immediately (within 10 seconds) use the eyewash or acid shower, as appropriate. Flush with copious amounts of tepid water for a minimum of 15 minutes. Request immediate assistance from the school's health care provider. Note that an eyewash and acid shower are required safety engineering equipment for science laboratories!

5. **Swallowed Poisons**: Accidental swallowing of poisonous chemicals in the laboratory can happen. It is critical to review SDS with students prior to use of these chemicals so all are familiar with their potential harm to the body. If the person becomes unconscious or is convulsing, do not induce vomiting. The same is true should the person complain of a "burning feeling" in their throat. Provide plenty of water or milk if available. Request immediate assistance from the school's health care provider. It is also wise to contact the Poison Control Center if you know what poison has been accidentally taken.

6. **Penetrating Objects**: Use of projectiles, walking in a laboratory with sharp hazards, etc., can be hazardous and cause body penetration. Do not remove the object. Try to keep the individual calm and still. Request immediate assistance from the school's health care provider.

7. **Lacerations**: Broken glassware or other sharp objects can cause cuts in the skin. If bleeding occurs, try to have the injured person put on latex or NIOSH approved plastic gloves and apply direct pressure to control bleeding. If that is not possible, use caution to keep a barrier (glove) between you and the injured person while trying to apply direct pressure. Request immediate assistance from the school's health care provider.

8. **Shock**: Symptoms of shock include faint pulse, clammy skin, nausea and/or vomiting and increased breathing. The victim should be lying down with feet elevated. Cover with a blanket to keep warm. Request immediate assistance from the school's health care provider.

9. Allergic Reaction: Symptoms of Allergic Reaction include

a. Symptoms of a mild allergic reaction can include:

hives (itchy red spots on the skin)

itching

nasal congestion (known as rhinitis)

rash

scratchy throat

watery or itchy eyes

b. Severe allergic reactions can cause the following symptoms:

abdominal cramping or pain

pain or tightness in the chest

diarrhea

difficulty swallowing

dizziness (vertigo)

fear or anxiety

flushing of the face

nausea or vomiting

heart palpitations

swelling of the face, eyes, or tongue

weakness

wheezing

difficulty breathing

unconsciousness

If someone experiences an allergic reaction and doesn't know what's causing it, they should see their doctor to determine what the cause of the allergy. If they have a known allergy and experience symptoms, they may not need to seek medical care if your symptoms are mild. In most cases, over-the-counter antihistamines, such as diphenhydramine (Benadryl), can be effective for controlling mild allergic reactions. Contact the school nurse for additional information.

If you or someone experiences a severe allergic reaction, immediately seek emergency medical attention. Check to see if the person is breathing, call 911, and provide CPR if needed and trained to do so. Also contact the school nurse for assistance. People with known allergies often have emergency medications with them such as an epinephrine auto-injector (EpiPen). Epinephrine is a "rescue drug" because it opens the airways and raises blood pressure. The person may

need help to administer the medication. If the person is unconscious, you should:

Lay the person flat on their back.
Elevate the person's legs.
Cover the person with a blanket.

Automatic External Defibrillator AEDS or Automatic External Defibrillators are small, lightweight devices that look at a person's heart rhythm (through special pads placed on the torso) can recognize ventricular fibrillation (VF), also known as "sudden cardiac arrest" or SCA. If SCA is present, and AED will advise, and will talk the responder through some steps to defibrillate are designed to be used by lay rescuers and "first responder". The AED is part of CPR. For maximum survivor benefits, both tools must be used together! Only certified AED and CPR trained employees are allowed to administer these tools in a cardiac emergency.

Appendix 6 Chemical Safety Inspection – Laboratory and Prep Room Inspection School

Room Date _____ Instructor Responsible for Room

Inspection by

Needs Attention

1. Exits clear of obstructions
2. Posted "Exit" signs
3. Directions posted for exiting in case of fire
4. Fire extinguisher full and the most recent inspection tag attached
5. Fire blanket ready to use in blanket box
6. Emergency gas shut off in room
7. Gas jets are labeled
8. Gas jets are functional-not blocked
9. Water faucets are labeled hot and cold
10. Sinks are clear of debris
11. Sinks drain freely
12. Area surrounding eyewash is clear

13. Eyewash is clearly marked and functional

14. Goggles are stored in a storage container and numbered

15. Safety Goggle Statute clearly posted

16. There are sufficient number of goggles for all students

17. Instructor has a set of goggles and lab coat

18. There is a sufficient supply of gloves for all students

19. NFPA Code/Hazardous Mat Info clearly posted

20. Electrical outlets are functional

21. The electrical outlet ground-fault system is functional

22. The location of the master electrical shut-off is known and labeled

23. The location of the master gas shut-off is known and labeled

24. Waste jars are labeled and visibly accessible

25. Hood is in good working order

-inside light

-outside light

-air flow velocity (minimum: 100 ft. /min)

26. No chemicals are stored in the hood

27. Work areas are cleared of paper, extraneous materials

Needs Attention

28. A sufficient quantity of aprons is available

29. Overhead lights are functional

30. Windows open and close freely

31. Clean-up spill material location is available

Materials are Available

-Spill Pillow

-“Hot Hands”

-Dust Pan and Broom

-Paper Towels

-Spill Cart location sign over “exit” sign

-Classroom Spill Kit

-Classroom Bucket of Sand

32. The intercom is functional

33. Chemicals in the room are labeled, including the NFPA codes 34. The shower is functional

35. Electrical devices have 3 prong plugs.
36. SDS envelope (for experiments in progress)

ADDITIONAL COMMENTS