

Carmel Central School District

CHEMICAL HYGIENE PLAN

For

High School Laboratories

GENERAL GUIDELINES FOR WORKING WITH LABORATORY CHEMICALS

1. It is essential to minimize chemical exposure to the greatest extent possible. Because few laboratory chemicals are without hazards, precautions for handling all chemicals should be exercised. As a rule, skin contact with chemicals should always be avoided.
2. Avoid an underestimation of risk. Exposure to laboratory chemicals should be minimized even for substances of no known significant hazard. Special precautions should be taken for those substances which have special health hazard risks. One should assume that any mixture of substances will be more toxic than either of its single components alone. One should also assume that all substances of unknown toxicity are toxic.
3. Adequate ventilation must be provided. The best way to prevent exposure to hazardous substances is to prevent their escape into the atmosphere by use of fume hoods and other ventilation controls.
4. Institute a chemical hygiene committee to minimize exposures to toxic substances. It is recommended under the OSHA Laboratory Standard 1910.1450.
5. Observe the PEL's and TLV's. The OSHA Permissible Exposure Limits and the American Conference of Governmental Industrial Hygiene Threshold Limit Values should not be exceeded.

CHEMICAL HYGIENE RESPONSIBILITIES

1. The **Science Dept. Head** has the ultimate responsibility for chemical hygiene and must work with other administrators; provide support for the chemical hygiene plan.
2. The **Science Dept. Head** is responsible for chemical hygiene in the building.
3. The **Science Dept. Head** has the responsibility for chemical hygiene in the lab including the responsibility to:
 - * Ensure that affected personnel know and follow all safety rules, use appropriate personal protective equipment, and provide students with appropriate safety training.
 - * Conduct regular formal housekeeping inspections including inspections of emergency equipment.
 - * Know the current legal requirements concerning regulated substances.
 - * Ensure that the facilities are adequate for any material being used.
 - * Plan and conduct each lesson in accordance with the chemical hygiene program. Lesson plans should include all possible hazards, preventive measures and emergency responses for each hazard.
 - * Develop and follow sound personal chemical hygiene habits.

THE LABORATORY FACILITY

1. DESIGN

- * An appropriate ventilation system should have air intakes and exhausts located to avoid recirculation of contaminated air.
- * The facility should provide adequate, well-ventilated storerooms, laboratory fume hoods, and sinks.
- * Other safety equipment shall include eyewash stations and drenching showers.

2. VENTILATION

- * Natural Dilution: This system should provide a source of air for breathing. It will not be relied upon for protection from toxic substances released into the lab.
- * Hoods: A laboratory fume hood should be provided for demonstration. Each hood will be monitored for adequate performance by the **Science Dept. Head**.
- * Modifications: Any alterations to the ventilation system should be made only by qualified personnel (HVAC engineer), and if testing indicates that worker protection from airborne toxic substances will continue to be adequate.
- * Quality: Airflow should be six air changes per hour. The hood face velocity should be maintained 60 - 100 linear feet per minute, at minimum.

COMPONENTS OF THE CHEMICAL HYGIENE PLAN

1. PROCUREMENT

- * No container will be accepted if leaking or without an adequate label and Material Safety Data Sheet.

2. STORAGE

- * Toxic substances should be segregated in a chemical storage cabinet off limits to unauthorized individuals.
- * Stored chemicals should be examined at least annually for replacement, deterioration and container integrity by the **Science Dept. Head**. Amounts will be stored in the smallest practicable quantity. Yearly inventories will be conducted and unneeded items will be disposed of through **Miller Environmental Group, Inc @ 845-569-1200**.
- * Chemicals will be stored in accordance with accepted standards of compatibility. An inventory list arranged alphabetically will be posted in the storage room. Material Safety Data Sheets will be arranged alphabetically and located in the storage room.

3. DISTRIBUTION FROM STORAGE AREA

- * When bulk quantities of chemicals are hand carried, the container will be placed in a bottle carrier or bucket.

4. AIR MONITORING

- * Monitoring of airborne concentrations of toxic substances may be appropriate when testing or redesigning hoods or when highly toxic substances are used on a regular basis which is not anticipated, or when using chemicals that require initial monitoring.

5. HOUSEKEEPING

- * Formal housekeeping and inspections will be performed at least biannually. The purpose of this is to identify hazards and determine whether to implement control measures such as ventilation, modified work practices or additional personal protective equipment. Suitable facilities for the quick drenching of personnel exposed to corrosive or injurious chemicals will be used for eyewash and shower emergencies. This device will be inspected at least biannually. Informal inspections will be continuous. Eyewash fountains and safety showers should be inspected and tested quarterly. Records of testing and inspections should be maintained. Procedures for restarting out-of-service equipment should be established. Stairways and hallways should not be used as storage areas. Access to exits, emergency equipment, and utility controls should **never** be blocked.

6. MEDICAL PROGRAM

- In case of spills or emergencies where employees show signs and symptoms of overexposure, should be immediately reported to the School Nurse.

7. PROTECTIVE EQUIPMENT AND APPAREL

- * Splash Goggles
- * ANSI approved safety glasses
- * Chemical resistant aprons
- * Gloves
- * Hair ties

8. RECORDS

- * Accident reports will be written and retained for all accidents involving injuries, property damage and near misses.
- * Inventories, Material Safety Data Sheets and records indicating attendance at Employee Right to Know Training will be maintained in accordance with the Federal Hazard Communication Standard.
- * Maintain records of measurement of employee exposure and any medical consultations and exams that are conducted for **[40 years or for the duration of employment plus 20 years, whichever is longer, or in accordance with 1910.20]**.

9. SIGNS AND LABELS

- * Emergency telephone numbers will be posted in labs, and the main office.
- * Identifying labels must show contents of containers and associated hazards.
- * Location signs for safety showers, eyewash stations, first aid equipment, exits, areas where food and beverages are prohibited and warnings at areas where unusual hazards exist will be posted.

10. SPILLS

- * In the case of a spill, the administration will be notified by **the main office**. It is the responsibility of the administration to evacuate school if necessary. In the case of a fire or major spill, the employee is responsible for evacuating the premises by fire alarm.
- * The written emergency action plan is located in **the main office** and will be communicated to all personnel. Spill control procedures will include approved containment, cleanup and transportation methods.

11. INFORMATION AND TRAINING

- * Employees will be trained upon initial assignment concerning chemicals available,

procedures, location of the chemical hygiene plan, location of Material Safety Data Sheets, and method of hazard identification (refer to paragraph F of occupational exposure to hazardous chemicals in the Chemical Hygiene standard). Annual refresher training will be covered by the **Science Dept. Head**. Particularly hazardous chemicals (carcinogens, reproductive toxins, etc.) will not be used. If their use is anticipated or a chemical is newly deemed particularly hazardous, proper provisions will be made in accordance with 1910.1450(e)(3)(viii).

12. WASTE DISPOSAL PROGRAM

- * The waste disposal program should specify how waste is to be collected, segregated, stored and disposed of. Unlabeled containers of chemicals and solutions should be promptly identified and disposed of if need be. Indiscriminate disposal by pouring waste chemicals down the drain or adding them to refuse for landfill burial is unacceptable. Contact **the Director of Facilities** to arrange for a hazardous waste disposal pickup through certified waste haulers.

APPENDIX A

GENERAL LABORATORY RULES/STANDARD OPERATING PROCEDURES

I. EMERGENCY FIRST AID PROCEDURES

- a) Eye Contact: Flush eyes with copious amounts of water for at least 15 minutes and seek medical attention.
- b) Ingestion: Read the label for directions and immediately seek medical attention. Contact the 24 hour emergency poison control center at 1-800-336-6997.
- c) Skin Contact: Flush the affected areas with copious amounts of water and remove any contaminated clothing. If symptoms persist after flushing, seek medical attention.

II. PERSONAL PROTECTIVE EQUIPMENT

- a) Whenever appropriate:
 - ANSI approved eye protection must be worn.
 - Gloves will be worn which will resist penetration by the chemical being handled and which have been checked for pin holes, tears or rips.
 - Lab coats or aprons to protect skin and clothing from chemicals will be worn.
 - Footwear should cover feet completely and open-toed shoes will be prohibited.

III. HAZARD PREVENTION

- a) Conduct periodic in-house safety and health inspections with an emphasis identifying safety hazards.
- b) Carry out regular fire or emergency drills and review the results.
- c) Have actions preplanned in case of an emergency (e.g., equipment should be turned off, preplanned escape routes, designated meeting place outside the building and designated person to authorize the re-entry into the building).
- d) Have the appropriate equipment and materials available for spill control.
- e) Keep up-to-date emergency phone numbers posted next to the telephone.
- f) Reduce risk by using diluted substances instead of concentrates.
- g) If feasible, use smaller quantities of hazardous materials for laboratory demonstrations.
- h) Use films, videotapes, or other methods rather than experiments involving extremely hazardous substances.
- i) Substitute with a less hazardous substance.
- j) Analyze accidents to prevent repeat performances.
- k) Purchase chemicals in minimum quantities, wherever feasible.
- l) Do not use damaged glassware.

IV. GENERAL LABORATORY SAFETY

- a) Obtain and read the Material Safety Data Sheet for each hazardous chemical.
- b) Analyze new lab procedures in advance to identify possible hazards.
- c) Wash hands before and after work, and after spill cleanups.
- d) Do not smell or taste chemicals.

- e) Never work alone in a science laboratory or storage area and do not allow students to work unsupervised.
- f) Never eat, drink, smoke, chew gum, or tobacco in the laboratory environment.
- g) Never store food in laboratory refrigerators.
- h) Never pipette liquids by mouth.
- i) Restrain loose clothing, long hair, and dangling jewelry.
- j) Never leave heat source unattended (gas burners, hot plates, mantels, etc.).
- k) Do not store reagents or apparatus on lab bench and keep shelves organized.
- l) Always used a fume hood when working with volatile substances.
- m) Never lean into the fume hood while hazardous chemicals are being used or when in use.
- n) Do not use the fume hood as a storage area.
- o) Do not mix chemicals in the sink drain.
- p) Always inform co-workers of plans to carry out hazardous work.
- q) Avoid horseplay, practical jokes, and other any distracting behavior.
- r) Be alert to unsafe conditions and correct them when detected.
- s) Label all chemicals accurately with date of receipt or preparation and any other precautionary information for handling.
- t) Never use a reagent until the label has been read and contents checked.

V. FACILITY MAINTENANCE

- a) Place fire extinguishers near escape routes, and also in areas of high hazards.
- b) Regularly inspect fire extinguishers, maintain records of inspections and train personnel in the proper use of extinguishers.
- c) Never block escape routes.
- d) Never block a fire door opening.
- e) Never store materials in aisle ways.
- f) Have separate containers for trash and broken glass.
- g) Regularly inspect safety showers and eyewash stations and keep records of inspections.

- h) Regularly check the ventilation in hoods for proper air flow.
- 1) Chemical storage shelves with close able doors should be used for flammable materials and acids.

List of Chemicals used in Regents Chemistry

Acetic acid (ethanoic acid)	Sodium bicarbonate
Acetone	Sodium bisulfite
Ammonium hydroxide	Sodium fluoride
Amyl alcohol (pentanol)	Sodium hydroxide
Barium hydroxide	Sodium iodide
Barium nitrate	Sodium oxalate
Benzoic acid	Sodium thiosulfate
Biuret	Sodium sulfite
Bromine	Strontium chloride
Calcium (metal)	Strontium nitrate
Calcium chloride, dehydrate	Sulfur
Calcium sulfate	Sulfuric acid
Cobaltous chloride	Tin (II) Chloride
Copper (II) chloride dehydrate	Toluene
Copper (metal)	Vierosene
Copper (II) nitrate	Zinc (metal)
Copper (II) sulfate	
Dichloromethane (methylene chloride)	
Ethanol	
Hydrochloric acid	
Iodine	
Isopropyl alcohol	
Iron (metal)	
Iron (III) chloride	
Iron (III) nitrate	
Lead (metal)	
Lead (II) nitrate	
Magnesium (metal)	
Magnesium hydroxide	
Magnesium nitrate	
Magnesium sulfate	
Magnesium dioxide	
Manganous chloride	
Nitric Acid	
Octanol-2	
Potassium bromide	
Potassium chlorate	
Potassium chloride	
Potassium iodate	
Salicylic acid	
Silver nitrate	

