



Chemical Hygiene Plan

For

Middle Schools:

Belle Isle
Jackson
Jefferson
Rogers
Roosevelt
Taft
Webster

High Schools:

Capitol Hill
Douglass
Grant
John Marshall
Northeast
Northwest Classen
Oklahoma Centennial
Southeast
Star Spencer

May 2014

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I. Chemical Hygiene Plan

May 2014

For Science Departments of the Oklahoma City Public School District

Oklahoma City Public Schools has developed a Chemical Hygiene Plan to explain the policies and procedures that will promote the safe operation of the school laboratory. In addition, the Chemical Hygiene Plan satisfies the requirements of the U.S. Department of Labor, Occupational Safety and Health Administration, 29 CFR Part 1910.1450 as adopted in Oklahoma Statutes (O.S.) Title 40., *Occupational Exposures to Hazardous Chemicals in Laboratories*. This regulation is known as the “Laboratory Standard”; the objective of the “Laboratory Standard” is to protect employees from health hazards associated with hazardous chemicals in the laboratory.

In Oklahoma, the federal Occupational Safety and Health Act, 29CFR1910, applies to all private employers. However, The Oklahoma Department of Labor has chosen to adopt the OSHA Standards, and apply them to protect employees of public school districts.

II. Chemical Hygiene Officer

The Chemical Hygiene Officer for each high school shall be a member of the science department or administrative staff with a chemistry background as assigned annually by the Principal or district administration. This person should be given release time if they are a teacher to perform their duties described in Part IV Chemical Hygiene Officer Duties.

_____ has been appointed

(Name of Person)

Chemical Hygiene Officer at _____

(Name of School)

District Administrator of Safety: _____

Date: _____

A copy of this completed form is to be filed with the Chemical Hygiene Plan in the Principal's office of each secondary school. A copy is to be submitted to the District Safety Department.

III. Chemical Hygiene Plan

For Science Departments of Oklahoma City Public School District

Overview

Purpose: The Chemical Hygiene Plan has been developed to provide employees of Oklahoma City Public School District with information necessary to safely work in the school science laboratory.

Access: All components of the Chemical Hygiene Plan will be available to all employees as follows:

1. Each secondary school will have copies of the Chemical Hygiene Plan, the school chemical inventory, and the Materials Safety Data Sheets (MSDS) or Safety Data Sheets (SDS) in the Principal's office, science department and/or chemical storage area.
2. Each secondary school science teacher will be given access to a copy of the Chemical Hygiene Plan through a link on the Oklahoma City Public School District homepage at:
<http://www.okcps.org/Departments/SafetyandSecurity/tabid/23906/Default.aspx> (or provided one via email.)
3. Records of previous exposure or medical records related to hazardous chemicals in the science laboratory will be available from the Human Resources office.

Revisions: All components of the Chemical Hygiene Plan will be reviewed annually and necessary revisions will be made and disseminated.

Compliance: An annual evaluation of compliance to the OSHA Laboratory Standards and an inspection of the science chemical storage areas of each secondary school will be conducted. A written report will be completed noting any conditions not in compliance with the OSHA Hazardous Chemicals in Laboratories Standards, CDC/NIOSH School Chemistry Laboratory Safety Guide, and the Chemical Hygiene Plan for Science Departments of Oklahoma City Public School District. Problems indicated by the inspection will be noted and corrective measures will be taken in a timely manner with the cooperation of the school. A copy of the inspection report and any notations will be kept by the school Chemical Hygiene Officer and the School Principal and may be viewed by other employees of the school upon request.

IV. Chemical Hygiene Officer Duties

Role: Chemical Hygiene Officer has the duty and responsibility of monitoring the Chemical Hygiene Plan.

Their duties will include:

1. Being familiar with all aspects of the Chemical Hygiene Plan, especially chemical storage and safety provisions in the science area.
2. Being a contact person for disseminating information involving chemical safety to employees of the school. This will include an annual training for employees (See Section IX - Employee Training).
3. Being a resource for employees at the school on matters involving the use of chemicals in the science laboratory.
4. Inspecting safety equipment at the beginning of each semester and cooperating with the annual inspection of laboratories and chemical storage areas. See Section III – Compliance and Section VIII – Facilities and Safety Equipment of Science Laboratories.
5. Reporting to the school principal and any other persons deemed necessary, any conditions involving chemicals that pose risks to health or safety.
6. Monitoring science chemical inventories and updating the school chemical inventory list when necessary.
7. Making requests to the Campus Facility Supervisor/Lead Building Maintenance Worker for disposal of unwanted chemicals from the science area. A request for disposal of unwanted chemicals includes the name of the chemical, if known, and the quantity of the chemical. Requests for disposal of chemicals should be sent to the Campus Facility Supervisor/Lead Building Maintenance Worker **no later than April 15th** of each school year.
8. Review chemical purchase orders to indicate no prohibited chemicals are being ordered.

While the appointment of a Chemical Hygiene Officer is intended to enhance safety for employees, it does not lessen the responsibility of any employee to learn and practice safe procedures for working and teaching in a school science laboratory.

V. Operating Procedures – General Rules for Employees

All employees involved in the science laboratory environment or teaching a science lesson involving chemicals must read and adhere to the provisions of the Science Safety Guidelines for Teachers (Appendix B), the OKCPS District Chemical Hygiene Plan and model the same correct, safe behaviors expected of students in the Science Safety Rules and Procedures Agreement.

No teacher or other employee shall attempt a laboratory experiment unless they are appropriately trained in that science discipline (highly qualified in their field), are fully aware of possible hazards, and are willing to follow all procedures necessary for a safe laboratory experience. No experiment is justified if the safety of an employee or student is in doubt.

In addition, science teachers shall:

1. Maintain records of the amounts of these materials on hand, amounts used and the names of teachers involved.
2. Minimize all chemical exposure.
3. Not underestimate chemical hazards.
4. Know and understand the hazards of each chemical reactant and each of the products of chemical experiments as stated in the MSDS/SDS, lab direction, etc.
5. Know how to properly store all chemicals. If there is a question, the Chemical Hygiene Officer (CHO) for the school/or district should be consulted.
6. Wear appropriate eye protection at all times. Chemical splash goggles must be worn anytime chemicals, glassware, or heat are used in the laboratory.
7. Use protective safety equipment to reduce potential exposure, i.e. gloves, respirators, fume hood, etc., especially when working with carcinogens, reproductive toxins, and substances with a high degree of acute toxicity. (See Appendix G) A safety shield or fume hood must be used for hazardous demonstrations.
8. Never perform a **first-time** chemical demonstration in front of your class. Always perform first-time demonstrations in front of other instructors to evaluate the safety of the demonstration.
9. Know the locations for all personal safety and emergency equipment such as eye wash, shower, fire extinguisher, and spill control materials.

10. Know appropriate emergency procedures, waste disposal, spill clean-up, evacuation routes, and fire emergency notification.
11. Only highly qualified science teachers/staff may handle concentrated materials requiring mixing or dilution.
12. Concentrated chemicals will not be moved from room to room or other buildings while students are passing between classes.
13. Exercise great care in moving chemicals by using trays or carts with raised edges. These chemicals shall be placed in proper storage carriers for added safety. Do not move these chemical while students are passing from class to class.
14. When working in your laboratory and rooms immediately wash hands thoroughly after handling any chemicals or other science materials before going onto other activities, such as restroom, lunch and working with students.
15. Do at least quarterly (monthly would be better) inspections of all electric cords on science equipment, test for gas leaks (using dish soap and water) on Bunsen burners, and test eyewash and showers monthly for your room and laboratory areas. Attached inspection tags on the eyewash and shower shall be filled out each time this is performed.
16. All science teachers shall check/test equipment and rooms that they use throughout the year themselves and keep their own records. Records shall be turned into the CHO or District Safety Department at the end of each year for review.
17. Any equipment not working properly (safely) shall be reported to the District Safety Department, CHO, and maintenance as soon as possible. All equipment shall be removed and labeled broken, date checked, who checked and any note to what the problem could be to the best of your ability.
18. Teacher of record for the majority of the time in such rooms and laboratories will sign and date all inspection test/checks on showers and eyewashes in their rooms for CHO, district and safety inspections for other agencies.
19. All science rooms/labs and stockrooms shall be secured before leaving even for a few seconds. (Lock the doors)

VI. Chemical Storage Rules and Procedures

No chemicals shall be purchased or used in science laboratory exercises unless they:

- (a) support the Oklahoma State Science Curriculum
- (b) are published in an appropriate laboratory manual with complete instructions.
- (c) and are supported by CDC/NIOSH School Chemistry Laboratory Safety Guide

Chemicals are to be purchased from commercial chemical suppliers except for those chemicals listed in Appendix A that may be purchased from local community suppliers. **Under no circumstances** are chemicals to be accepted as gifts or otherwise acquired from private individuals, manufacturing companies, government agencies, etc. The teacher shall be familiar with any exercise involving chemicals and follow safe procedures for use and storage of those chemicals.

The quantity of chemicals stored shall not be excessive. It is recommended that quantities be limited to amounts no greater than what will be consumed over two academic years. Refer to the CDC/NIOSH Guidelines for specifications on shelf life and storage directions.

1. An updated inventory of all chemicals, their quantities, and storage location shall be kept in the Principal's office and in the science department and/or chemical storage area.
2. All chemicals including solutions you have made must be clearly labeled. In addition to the contents and concentration, the date of purchase or mixing shall be written on the label. **No unlabeled chemicals** are to be stored.
3. All chemicals shall be stored in chemically compatible families. Refer to the CDC/NIOSH for information about compatible families.
4. Store chemicals in a separate, locked, dedicated storeroom. If chemicals are used in the classroom for lab exercises, they must be returned to the proper storage location at the end of the period unless needed in the next subsequent period.
5. Only authorized personnel are allowed in the chemical storage area. Students are **NOT** ever authorized.

6. Store the minimum amount of chemicals needed and avoid bulk purchases. Smaller containers, though generally more expensive, promote freshness, maintain quality, reduce the likelihood of contamination, and lessen severity of spills.
7. To reduce the potential for overexposure to more hazardous materials consider purchasing ready-to-use products that require no mixing or dilution of concentrated ingredients when appropriate.
8. Store corrosives in appropriate corrosives cabinets.
9. No flammable materials shall be stored outside of an approved flammables storage cabinet unless in safety cans.
10. Store flammables away from all sources of ignition.
11. Never store flammables in refrigerators unless the refrigerator is explosion proof.
12. Avoid storing hazardous chemicals on shelves above eye level.
13. The storage area and cabinets shall be labeled to identify the hazardous nature of the products stored within.
14. Chemicals shall not be stored on the floor except in approved shipping containers.
15. Storage areas shall be well ventilated.
16. Chemical exposure to heat or direct sunlight shall be avoided.
17. Reduce the accumulation of waste by disposing of it as soon as possible after use. This will eliminate the complications associated with the disposal of large quantities.
18. Metal and glass containers of flammable liquids are limited to a maximum size of one gallon. Approved safety cans are limited to a maximum size of two gallons.
 - Acetone
 - Amyl Ethyl Ketone
 - Cyclohexane
 - Ethanol
 - Methanol

19. Compressed gas cylinders must be stored with the cylinder valve closed, safety cap installed if provided, away from heat, and adequately secured and stored in the upright position to prevent damage caused by rolling or falling. Acetylene and liquefied gas cylinders are stored in the upright position and safely secured.
20. Employees conducting an inventory or inspection of a chemical storage area must wear splash goggles and lab coats. If chemical containers are being rearranged, employees are not to work alone.
21. Drawers and cabinets at each laboratory station need to be checked and cleaned after each lab exercise.

VII. Specific Rules and Guidelines for Chemical Safety in the School Science Laboratory

Material Safety Data Sheets/Safety Data Sheets:

Every chemical on campus is required to have an MSDS/SDS. A Material Safety Data Sheet/Safety Data Sheet (MSDS/SDS) is a technical information sheet detailing health and safety information concerning a hazardous chemical or chemical substance.

MATERIAL SAFETY DATA SHEETS used prior to 2012 generally contain the following information:

PRODUCT IDENTIFICATION

This section identifies the chemical and manufacturer. It gives both the chemical and trade names along with any synonyms for the substance.

HAZARDOUS INGREDIENTS

The percentage of each hazardous ingredient in the substance is given and data on its hazards are provided.

Often the concentration of the substance to which a person can safely be exposed is given. The safe exposure limit is reported as the Threshold Limit Value (TLV) or the Permissible Exposure Limit (PEL). Both TLV's and PEL's represent safe exposure limits and are figured for average exposures over a typical eight-hour workday.

TLV's are used to express the airborne concentration of a material to which **nearly** all persons can be exposed day after day without adverse effects. TLV's are expressed in three ways:

TLV-TWA: The allowable time-weighted average exposure limit calculated for a normal eight-hour workday.

TLV-STEL: The short-term exposure limit or maximum concentration for a continuous fifteen minute exposure period (maximum of four such periods per day with at least sixty minutes between exposure periods provided that the daily TLV-TWA is not exceeded).

TLV-C: The ceiling exposure limit – the concentration that should not be exceeded even instantaneously.

PEL's also may be expressed as a time-weighted average (TWA), short-term exposure level (STEL) or a maximum ceiling exposure level (C).

TLV's and PEL's listed on a MSDS/SDS are usually expressed as "parts per million" (ppm), that is, parts of a contaminant per million parts of air. TLV's and PEL's may also be expressed as milligrams per cubic meter (mg/m³).

PHYSICAL DATA

Here the MSDS covers the physical characteristics of the chemical or chemical substance. In order to control potential hazards, it is important for employees to be familiar with the physical characteristics of the substances that are used.

FIRE AND EXPLOSION DATA

The section provides information concerning a substance's potential for fire and explosion, plus any special precautions that should be taken during firefighting activities.

HEALTH HAZARD DATA

This section gives health information, including primary routes of entry for the chemical or chemical substance, signs and symptoms of exposure, medical conditions aggravated by exposure and whether the substance is a known carcinogen (cancer-causing agent). In addition, it gives first aid procedures so employees can be prepared if an emergency occurs.

The toxicity of a substance is usually reported as LD50 (Lethal Dose) for solids and liquids and LC50 (Lethal Concentration) for dusts, mists, gases and vapors. The LD50 is the ingested **dose** of a substance that produces death in 50 percent of a group of laboratory animals. The LC50 is the inhaled **vapor concentration** of a substance that produces death in 50 percent of the animals.

REACTIVITY DATA

This section describes that material's stability, incompatibility with other substances, and hazardous products that may be produced if the substance should decompose. It also lists conditions to be avoided for storage and handling of the substance.

SPILL AND LEAK PROCEDURES

This section gives special information on how the substance should be handled during a spill or leak. It also describes the recommended disposal method. This information is especially important when preparing emergency procedures.

SPECIAL PROTECTION INFORMATION

This section lists any personal protective equipment (respiratory protection, gloves, eye protection) needed to safely handle the substance. If protective equipment is required, this section will list the specific types that are recommended, such as a full-face mask respirator, rubber gloves, and chemical safety goggles. Safe use of some substances may require special ventilation, and this information will be found in this section of the MSDS.

SPECIAL PRECAUTIONS

This section lists special precautions to follow when handling the chemical or chemical substance. Health and safety information not covered in other parts of the MSDS are listed here.

SAFETY DATA SHEETS

The Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)), revised in 2012, requires that the chemical manufacturer, distributor, or importer provide Safety Data Sheets (SDSs) (formerly MSDSs or Material Safety Data Sheets) for each hazardous chemical to downstream users to communicate information on these hazards. The information contained in the SDS is largely the same as the MSDS, except now the SDSs are required to be presented in a consistent user-friendly, 16-section format. This brief provides guidance to help workers who handle hazardous chemicals to become familiar with the format and understand the contents of the SDSs.

The SDS includes information such as the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical. The information contained in the SDS must be in English (although it may be in other languages as well). In addition, OSHA requires that SDS preparers provide specific minimum information as detailed in Appendix D of 29 CFR 1910.1200. The SDS preparers may also include additional information in various section(s).

Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices, and emergency control measures (e.g., firefighting). This information should be helpful to those that need to get the information quickly. Sections 9 through 11 and 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information, and other information including the date of preparation or last revision. The SDS must also state that no applicable information was found when the preparer does not find relevant information for any required element.

The SDS must also contain Sections 12 through 15, to be consistent with the UN Globally Harmonized System of Classification and Labeling of Chemicals (GHS),

but OSHA will not enforce the content of these sections because they concern matters handled by other agencies.

Specific Rules:

The rules and guidelines below are designed to avoid a number of hazardous situations. However, it must be realized that some employees such as chemistry teachers may be exposed to chemicals on a daily basis for a long period of time. These employees should be especially aware of the toxicological information on the Material Safety Data Sheets/Safety Data Sheets for chemicals they frequently use.

1. Never perform unauthorized laboratory experiments. Perform chemical experiments from a published procedure with an understanding of possible hazards. Deviation from authorized lab experiments requires approval from the District Safety Department, Chemical Hygiene Officer and site Principal.
2. Inspect all protective safety equipment before use. If defective, do not use.
3. Have appropriate types and sizes of fire extinguishers. Triclass ABC are appropriate for laboratories. Carbon dioxide fire extinguishers are inappropriate for laboratories. A Class D fire extinguisher or clean, dry sand should be available when working with flammable solids. Fire extinguishers shall be inspected every month.
4. Do not block fire exits. Keep all aisles clear.
5. Post emergency telephone numbers in the chemical storage area. Have a telephone, intercom, or other means of emergency communication in the laboratory. In the event of a hazardous chemical spill/explosion, evacuate the lab, call 911, and notify nurse and principal.
6. Clean up spills immediately and thoroughly. Follow approved spill cleanup procedures; spills shall only be cleaned up by approved personnel.
7. The use or storage of **mercury** or mercury compounds is prohibited. Spills involving mercury need special care by Hazardous Materials specialists and the Fire Department. Call 911 immediately should any amount of mercury be spilled. You cannot dispose of any mercury at your school.
 - a. **Thermometers, barometers**, or other devices containing **mercury** are not to be used. Although slightly less accurate, non-mercury thermometers remove a serious safety hazard and a troublesome

clean up procedure. The use of electronic substitutes, such as probe ware, is recommended.

- b. To have mercury-containing devices disposed of, call the Maintenance Supervisor.
8. Neutralizing chemicals, such as a spill kit, dry sand, kitty litter, and other spill control materials, should be readily available.
9. Chemical Disposal/Waste Plan
 - a. Due to the periodic disposal of unwanted chemicals by a licensed disposal company, the quantity limits on stored chemicals, and the restrictions on purchasing, the disposal cost of hazardous reagents from the school science department should be minimized. The Chemical Hygiene Officer will be in charge of disposal of all hazardous reagents.
 - b. All unknown chemicals will be considered hazardous.
 - c. In general, the small quantities (test tube amounts) of chemical waste generated by the science laboratory pose no problem for water treatment plants. Flush with adequate amounts of water to protect plumbing. If there are any questions about a substance, consult with the Chemical Hygiene Officer.
 - d. Biological preservatives such as alcohol or formalin may be flushed with water if quantities do not exceed a few gallons. However, it is suggested that specimens be ordered in packaging that uses the minimum amount of preservative. Non-formaldehyde preservatives are preferred.
 - e. Preserved dissection specimens must be placed in the proper biological waste bags and given to campus maintenance supervisor for disposal.
 - f. Procedure for acquiring and disposing of chemicals. The school's Chemical Hygiene Officer shall send a request for disposal of unwanted chemicals to the Maintenance Supervisor by April 15th of each school year. The Chemical Hygiene Officer must give approval in writing for the acquisition of any chemicals in secondary schools.
10. Work and floor surfaces shall be cleaned regularly and kept free of clutter.
11. Do not use chipped, etched, or cracked glassware. Glassware that is chipped or scratched presents a serious breakage hazard when heated or handled.

- a. These unusable and broken glassware shall be placed in a cardboard box, taped and labeled broken glass then turned over to housekeeping/custodial services for disposal.
 - b. Glassware shall never be placed in the classroom or laboratory waste can for disposal. Safety of school housekeeping/custodial is a priority as well as students, and other staff members.
12. Eye protection must be worn. Chemical splash goggles must meet ANSI Z87.1 Standard. Wear face shields when dealing with corrosive liquids, (i.e., full strength acids and bases).
 13. Wear gloves that offer protection for all hazards you may find in the lab.
 14. Always wear a lab coat or a chemical-resistant apron when dealing with corrosive chemicals.
 15. Do not pipette by mouth. Always use a pipette bulb or other appropriate suction device.
 16. Wash hands thoroughly after any chemical exposure or before leaving the laboratory.
 17. Never smell chemicals directly; always waft the odors to your nose using your hand.
 18. Foodstuffs shall not be present or eaten if in a room with toxic materials.
 19. Do not apply cosmetics in areas where laboratory chemicals are present.
 20. Read all labels carefully; the names of many chemicals look alike at first glance.
 21. **No unlabeled products** shall be stored anywhere in the science facility.
 22. Handle toxic, corrosive, flammable, and noxious chemicals under a fume hood.
 23. Do not expose flammable liquids to open flame, sparks, heat, or any source of ignition.
 24. At least every semester inspect all metal shelf clips in your acid cabinet to check for possible corrosion. Corroded shelf clips can lead to a shelf collapsing and causing dangerous spills.
 25. Use a safety shield when igniting flammable solids.

26. Use extreme caution when handling finely divided (dust-like) material. Finely divided materials may form explosive mixtures with air and also make inhalation of toxic materials more likely.
27. Discourage the use of contact lenses in areas where chemicals are used or stored. If contacts must be worn, wear non-vented goggles.
28. All accidents or near accidents (close calls) should be carefully analyzed with the results distributed to all who might benefit. Send your information to the Science District Safety Department for distribution.
29. In the event of an injury or exposure to a hazardous chemical, the person shall be referred to the school nurse as soon as possible. Fill out an accident report describing the event in detail before leaving campus for the school day. Accident report forms are obtainable from the school principal or on our district server.
30. Develop and practice Laboratory emergency plans (fire, spills, power failure, etc.) with your students.
31. All visitors (administration, evaluators, and any other person) must wear protective goggles and aprons when in a laboratory.

VIII. Facilities and Safety Equipment for Science Laboratories

For the safe operation of the Science Laboratory the following conditions are necessary where chemicals, open flames, heating of glassware, or release of fumes are involved.

1. An easily accessible fire blanket must be present where open flames are used.
2. Clean and functional splash goggles must be available.
3. Adequate laboratory ventilation must be provided when chemical fumes are liberated. Exhaust air must be vented externally to the building or otherwise purified. A rate of four to twelve air changes per hour is recommended. Refer to the operating procedure and manuals to ensure non-vented fume hoods are operating properly.
4. Fire extinguishers must be of the right type, Tri-class ABC, and they must always be properly inspected. A fire extinguisher must be located in the laboratory and/or the chemical storage area.
5. Eyewash/shower stations must be functional and flushed at least once a month. Attached inspection tags shall be filled out each time this is performed.
6. Fume hood must be functional. A level of 60 – 100 linear feet per minute *at the sash* is recommended, or follow the manufacturer's recommendations.
7. A safety shield must be available for demonstrations. This does not remove the responsibility for wearing safety goggles.
8. Full body showers are to be located in all secondary school chemistry labs.
9. Running water shall be available for hand washing in laboratories using preserved specimens or handling chemicals.
10. Laboratory size shall follow Occupational Safety and Health Administration's (OSHA) 1990 29 CFR Part 1910.1450 that requires a safe working environment for employees relative to the use of chemicals in science laboratories. A class size should not exceed 24 students with a minimum of 50 sq. ft. per student. This would be a minimum total area of 1,200 sq. ft. for a safe laboratory.

11. In no instance shall a classroom not properly equipped be used for laboratory exercises involving chemicals, flames, or release of fumes. The Chemical Hygiene Officer must inspect all safety equipment at the beginning of each semester and correct deficiencies immediately. The Chemical Hygiene Officer must keep documentation of corrective actions taken.

12. In no instance shall a non-certified science teacher be allowed to teach non-science courses in a science room/lab that is used primarily for science courses. A non-science teacher is not trained in safety procedures in the event of something that could happen in a science room. This practice could put students and teachers at risk of injury or even death.

IX. Employee Training

At the beginning of each year, the Chemical Hygiene Officer will provide an orientation about the Chemical Hygiene Plan to employees who will be working in the science laboratory and chemical storage areas. Employees hired after this orientation must be presented the same information before they begin work in the science laboratory.

The orientation will include the following:

1. Distribution of the written Chemical Hygiene Plan for Science Departments of Oklahoma City Public School District to each secondary school science teacher and each maintenance/custodial department. If these employees have copies already, any changes or updates of information will be provided.
2. Locations of the chemical inventory & Material Safety Data Sheets/Safety Data Sheets. Copies of MSDS/SDS sheets shall be in a location within the Science Department that is known by & accessible to all teachers who use these materials.
3. Procedure for reporting accidents.
4. Procedure for reporting unsafe conditions.
5. Procedure for medical treatment involving chemical exposure. Remember one source of information for medical treatment is found on Material Safety Data Sheets/Safety Data Sheets.
6. Procedure for acquiring and disposing of chemicals. The school's Chemical Hygiene Officer should send a request for disposal of unwanted chemicals including the name of the chemical, if known, and the quantity of the chemical to the Campus Facility Supervisor/Lead Building Maintenance Worker by April

15th of each school year. The Chemical Hygiene Officer must give approval in writing for the acquisition of any chemicals in secondary schools.

7. Instruction on how to read the Material Safety Data Sheets/Safety Data Sheets to obtain appropriate hazard information.
8. A reminder of the list of chemicals prohibited in the school science laboratory. (See Appendix C & D in the CDC/NIOSH School Laboratory Safety Guide)
9. Instruction on emergency procedures in the event of fire, chemical spills, or injury.

Additional employee training shall be regularly included in Science Department meetings and/or other in-service meetings.

Appendix A

Chemicals Purchased from Local Community Suppliers

The chemicals listed below may be purchased from local community suppliers such as grocery stores. All other chemicals are to be purchase from commercial chemical suppliers.

- Antacids
- Aluminum
- Aluminum foil
- Ammonia
- Aspirin
- Baking soda
- Baking powder
- Bleach
- Chalk – for lab experiments
- Corn syrup
- Copper
- Corn starch
- Dish detergent
- Drano
- Epsom salt
- Flour
- Food coloring
- Gelatin
- Hydrogen peroxide 2%
- Honey
- Iron
- Liquid bluing
- Nail polish remover
- Pancake syrup
- Plastic wrap
- Rock salt
- Copper sulfate pentahydrate
- Mineral oil
- Rubbing alcohol
- Salt
- Shampoo/conditioner
- Steel
- Sugar
- Tea bags
- Tie dye dyes
- Tylenol
- Vegetable oil
- Vinegar
- Windex
- Woolite
- zinc

Procedure for adding chemicals to the list of chemicals that may be purchased from local community suppliers

The Chemical Hygiene Officer may give a temporary approval for the purchase of a chemical not listed in Appendix A, Chemicals Purchased from Local Community Suppliers for the current school year.

1. The Chemical Hygiene Officer will notify District Safety Department of this temporary approval.
2. The District Safety Department will notify all other Chemical Hygiene Officers of this temporary approval.
3. At the beginning of each school year the Chemical Hygiene Officers will meet and review all chemicals that have received temporary approval during the previous school year and decide whether to add the chemicals to list of chemicals in Appendix A.

Appendix B

Science Safety Guidelines for Teachers

Oklahoma City Public School District

The following minimum guidelines must be read and observed by all teachers 6-12 who teach science. These guidelines are part of the Chemical Hygiene Plan and are reviewed annually.

General Guidelines:

1. It is the teacher's responsibility to know any hazards that might be associated with a laboratory experiment or demonstration and to take steps to protect themselves and their students against such hazards. Only demonstrate experiments and/or have students perform experiments that are very familiar to you. If there is any doubt about the safety of an experiment, wait until you can find someone who can answer your questions before proceeding.
2. Students must be under the active supervision of a science teacher during any science experiment. Teachers are never to leave the room while students are engaged in a laboratory exercise or when chemicals or equipment are in use in the room.
3. Teachers must be familiar with all safety equipment and emergency procedures. Safety equipment (safety goggles, aprons, etc.) appropriate to the laboratory experiment must be provided. The teaching environment shall be appropriate for the science activities performed. The teaching environment includes features such as room size, adequate ventilation, the presence of fire extinguishers, eye wash fountains, etc. Student maturity and behavior shall be taken into consideration when selecting laboratory exercises.
4. Students must be instructed in safety rules before lab activities. The "Oklahoma City Public School District Science Safety Rules and Procedures Agreement" is required for secondary school students enrolled in any science course. (See Appendix C)
5. Students must be instructed in procedures for leaving the science room under emergency conditions.
6. Teachers must record in daily lesson plans whenever they review safety procedures and new equipment to be used on the lab activity that will be performed.
7. Do **not** leave lesson plans for subs to do a lab activity with your students.

Chemical Guidelines:

Teachers who engage in laboratory activities involving chemicals need to consult the Chemical Hygiene Plan for more specific rules and procedures designed to protect them as employees of Oklahoma City Public School District.

1. Do not acquire or store any chemicals unless they support the Oklahoma Science Curriculum
2. Purchase or receive chemicals only from reliable sources such as science supply companies. Do not accept donations from other sources, private or public.
3. Avoid stockpiling chemicals in order to prevent problems with storage space, deterioration, magnitude of accidental spills, etc.
4. All chemicals must be stored in a locked storage room. Only authorized personnel shall have a key to this room. This room shall be keyed differently than room keys. Housekeeping/maintenance shall not have access to this room unless supervised by authorized personnel.
5. Adequate ventilation is essential. Most school classrooms, or classrooms not equipped as a science lab, do not have adequate ventilation for experiments involving volatile substances.
6. Chemical splash goggles must be worn during all chemical experiments. If students are observing a chemistry demonstration, a protective safety shield is needed in addition to the safety goggles.

Equipment Guidelines

1. Do not operate and do not allow a student to operate any piece of equipment that is not thoroughly familiar to you. Be sure that you have thoroughly explained the operation procedures to the student.
2. Teachers and students must wear eye protection when heating glassware, using chemicals, or performing experiments that could generate flying objects. In addition, a safety shield shall be used during demonstrations that pose these hazards.

3. Instruct students in the proper use of flames or heating elements before use in an experiment. Use alcohol burners with caution. Do not allow students to fill burners; fill in well-ventilated areas. Never fill when flames are in use; never keep stock containers of alcohol or other flammables in a room where flames are in use. Never transport a lit alcohol burner. If at all possible do not use alcohol burners in your labs. Alcohol has a low flash point and can cause severe damage to a person.
4. Never allow a student to focus direct sunlight through a microscope. Magnifying glasses can also cause eye damage if a student looks through them at the sun.
5. Thermometers, barometers, or other devices containing mercury are not to be present - ever.
6. Inspect all electrical cords before use. Keep areas around electrical cord, outlets, and equipment dry.

Biological Guidelines

1. No lab exercises involving the collecting of or use of blood (any body fluids) are to be performed. Blood experiments are to be done with commercially available blood substitutes and microscopy of human blood is to be done with commercially prepared slides, and not fresh smears.
2. The deliberate culture of microorganisms shall be done only if the teacher is familiar with safe culture procedures. No cultures are to be made using known pathogens. Human and animal body fluids, including saliva, are not to be cultured.
3. Care and common sense shall be used in collecting and handling live insects and other invertebrates.
4. Animals are permitted at school only with prior approval of the principal.
5. Vertebrate animals shall be kept in the classroom only if they can be treated humanely and their handling monitored by the teacher. Animals capable of inflicting bites shall be displayed only, not handled. No experimentation that causes pain, malnutrition, thirst, or other stress to an animal is permissible.
6. Students are not encouraged to bring pets from home. If a student brings an animal to school, it should support instruction based on the curriculum and be with the prior knowledge and approval of the teacher and the principal. Proper care and safe display of the animal must be provided.

7. Students and teachers shall wash their hands thoroughly after handling chemicals, plants and/or animals.

Science Field Trips

1. Field trips must be conducted in accordance with District policy.
2. Field trips must be well planned and include activities that support the Essential Knowledge and/or Essential Understandings of the Science Standards. Instruct students about any potential hazards at the field trip site.
3. Students must be under competent adult supervision. The number of adult supervisors should be appropriate for the type of field trip and the age and maturity of the students.
4. Field studies that leave the natural environment undisturbed are encouraged. If collecting specimens for further study, be conservative in the number of specimens collected and use methods that cause the least disruption to the habitat. Do not collect any rare or endangered species. Do not remove any specimens from a protected area such as a park, conservation area, or nature preserve.
5. Do not use bare hands when turning over rocks, logs, etc. or when handling animals capable of inflicting bites and stings. Regard the field trip site as a lab setting and provide protective equipment if necessary.
6. Do not allow students to eat or taste plant material collected in the wild, or drink from ponds, streams, or lakes.
7. Avoid using glass containers in the field. Use plastic or cardboard containers for collecting or transporting materials.

Appendix C

Oklahoma City Public School District

SCIENCE SAFETY RULES AND PROCEDURES AGREEMENT

In order to ensure that science experiments are safe and positive learning experiences, students and their parents shall read, discuss, and sign the science safety rules and procedures agreement. No student will be permitted to participate in laboratory work until the agreement is signed by a parent and student and returned to the teacher.

1. Act in a responsible manner at all times. Misconduct that endangers any student will not be tolerated.
2. Never work without your science teacher in the room. Do not handle any materials until instructed by your science teacher to do so.
3. Perform the experiments as directed. Do not do anything that is not part of an approved experimental procedure. Follow all instructions given by the teacher. Read the written procedures. If you don't understand a procedure or piece of equipment, ask the teacher.
4. Eating, or drinking in the lab or experimental work area are forbidden.
5. Wear appropriate protective equipment. A lab coat or apron and ANSI approved eye protection shall be worn when necessary. Keep hands away from face, eyes, and mouth while using chemicals or preserved specimens.
6. Learn the locations and operation of emergency equipment including eyewash fountains, safety showers, fire extinguishers, fire blankets, etc. During lab immediately report all accidents, injuries, close calls, or unsafe conditions to your teacher.
7. Closed shoes must be worn at all times; never go barefoot in the lab. Special care shall be taken with floppy clothing. Tie back long hair to keep it away from flames and chemicals.
8. Never taste a chemical. Never pipette by mouth – always use a pipette bulb.
9. Check odors only if instructed to do so by gently wafting some of the vapor toward your nose with your hand.
10. Carry sharp objects with tip or sharp edge pointing downwards. Do not try to catch falling sharp objects.

11. Use caution when heating materials in the lab. Keep hands and face away from the mouth of a test tube or beaker being heated. Turn off burner or hot plate when you are finished – never leave an active heat source unattended.
12. Do **not** enter science prep rooms or storage areas.
13. **Never** take chemicals, supplies, or equipment out of the laboratory without the knowledge and consent of the science teacher.
14. Clean your lab area; put away all equipment and reagents; wash your hands at the end of each work session. Before using any equipment report any damaged glassware or equipment to your teacher so it may be replaced.
15. All personal items, backpack, bags, etc... are to remain in a locked classroom. Personal items are not permitted in the lab. If your room is a combination classroom/laboratory all personal items must be placed away from lab tables and in a location that will not endanger anyone. Your teacher will instruct you of this location.
15. Remember your science teacher has the final word on your participation in science laboratory activities due to the safety of all.

Your Science Teacher may add additional safety instructions to the back of this form.

I, _____, have read, understand, and agree to follow these science safety rules and procedures. I agree to abide by any additional instructions, written or verbal, provided by my science teacher. Failure to follow these safety rules could result in loss of points from the assignment to removal from the class with loss of credit.

Student Signature

Date

Parent Signature

Date

List any allergies or medical problems of which your teacher should be aware, including contact lenses.

Teachers may use their own student safety contract but it must have the above information placed in it and be approved by the CHO.

Appendix D

Oklahoma City Public School District

Science Chemical Review List

No chemicals shall be purchased or used in science laboratory exercises unless they:

- (a) support the Essential Understandings and/or the Essential Knowledge found in the Oklahoma Science Curriculum, and
- (b) are published in an appropriate laboratory manual with complete instructions.

Chemicals are to be purchased from commercial chemical suppliers. **Under no circumstances** are chemicals to be accepted as gifts or otherwise acquired from private individuals, manufacturing companies, government agencies, etc. The teacher shall be familiar with any exercise involving chemicals and follow safe procedures for use and storage of those chemicals.

The quantity of chemicals stored shall not be excessive. Quantities shall be limited to amounts no greater than what will be consumed over two academic years.

The following list of chemicals was prepared using data from the Flinn Chemical Catalog/Reference Manual. Evaluation of these chemicals involved reactivity, toxicity, carcinogenic potential, explosiveness, and flammability. This brief list should be compared to the chemical inventory. Those chemicals preceded by an asterisk (*) shall not be purchased, used, or stored. The other chemicals listed shall be used or stored only with appropriate cautions. The MSDS/SDS shall be read before using these or any other chemicals. The Flinn Chemical Catalog/Reference Manual is a good source of information on potential hazards.

Hazards indicated: C = positive or suspected carcinogen

T = moderately to extremely toxic

R = highly reactive and/or corrosive

F or E = potentially flammable or explosive

This list is subject to periodic review and updating. Inquiries on the status of any chemical may be directed to the District Safety Department.

Acetamide – C	Antimony trichloride - T	Cadmium sulfate – C, T
Acetic acid (glacial) – T, F, R	*Arsenic – T	*Calcium carbide – F
Acetic acid – R	*Arsenic chloride – T	*Calcium cyanide – T
*Acetic anhydride – F, R, T	*Arsenic pentoxide – T	Calcium hypochlorite – T
Acetone – F, T	*Arsenic trioxide –C, T	Calcium nitrate (crystals) – F
Acetyl chloride – F	*Asbestos – C	Calcium oxide – R, F
Acrylonitrile – C	*Arcarite – C	*Carbon disulfide – F, E
dl-Adrenalin – T	*Barium chloride (crystals) T	*Carbon tetrachloride – T
*Aluminum chloride (anhydrous) – R, T	Barium oxalate – T	*Catechol (pyrocatechol) – T
*Ammonium bichromate – T, E, F	Barium peroxide – T, F (Demo Supply)	*Chlorine, chlorine water – T (fresh supply only)
Ammonium chromate – T	*Benzene – C, T, F	*Chloral hydrate – T
Ammonium dichromate – T, E, F	*Benzidine – T	*Chloretone (chlorobutanol) – T
Ammonium hydroxide (14M) – T	*Benzoin – C, T	*Chloroform – C, T
Ammonium hydroxide (6M) – T	Benzoyl chloride – T, R	Chlorpromazine – T
Ammonium nitrate (crystals) – T, E	*Benzoyl peroxide – T, E, R	*Chromium – C, T
Ammonium vanadate (ammonium metavanadate) – T	*Beryllium carbonate – T	*Chromium (powder) – C
*Aniline – T, C	Biuret solution – R	*Chromium oxide – C
*Aniline hydrochloride – T	*Bromine – T, F	Chromium potassium sulfate – T
*Anthracene – C	*Bromine water – T (fresh supply only)	*Chromium trioxide (chromic acid) – C, T
Antimony – T	*Cadmium – C, T	Cobalt – T
Antimony oxide – T	All Cadmium compounds – T	Cobalt chloride – T
Antimony pentachloride – R	Cadmium bromide – T	*Colchicine – C, T
	Cadmium carbonate – T	Cyclohexane – F, T
	*Cadmium chloride – C	*Cyclohexene – F, T, E
	Cadmium nitrate – C, T, F	

*Cyclohexanol – F, T	Iodine crystals – T, R (Demo Supply)	Nickel(ous) sulfate – T, C
Dichlorobenzene – T	Isobutyl alcohol – F, T	Nicotine – T
*Dimethylaniline – T	Isopentyl alcohol – F, T	Nitric acid – R
*Dichloroethane (ethylene dichloride) – C	Isopropyl alcohol – F	Osmium tetroxide – T
*2,4-Dinitrophenol – T, E	Lactic acid – R	Oxygen tanks – F
*Diisopropyl ether – E	All Lead compounds – T	Para-dichlorobenzene (1,4 Dichlorabenzene) – T
Dioxane – C	*Lead acetate (flakes) – T, C	*Paris green – T
Ethyl alcohol – F, T	*Lead arsenate – C, T	Pentane – F
*Ethylene dichloride (Dichloroethane – C, F, T	Lithium – F, R (max. qty. – 1 yr. demo supply)	*Perchloric acid – R, E
Ethylene oxide – T, F	Lithium nitrate crystals – E, R (max. qty. – 1 yr. demo supply)	Perchloroethylene – C, T
Ether (ethyl ether) – F, E	Magnesium – F	*Petroleum ether – F
Ferrous sulfate – T	Magnesium chlorate – T	*Phenol (Crystals or 88% solution) – C, T
*Formaldehyde (37% solution) – T, C	Magnesium perchlorate – R	1-Phenyl-2Thiourea – T
Formalin (10% formaldehyde) T	*Mercury (and all compounds) T	Phenylthiocarbamide powder – T
*Formic acid – R	Methyl alcohol – F, T	*Phosphorous, red or white – F
*Gasoline – F, E	Methyl ethyl ketone – F	*Phosphorous pentoxide – F, R
*Gunpowder – E	Methyl iodide – C	*Picric acid
*Hexachlorophene – T	Methyl methacrylate – T, F	Potassium metal – E, R (max. qty. – 1 yr. demo supply)
*Hydrobromic acid – T	*Millon's reagent solution – T	*Potassium cyanide – T
Hydrochloric acid – R	Nickel(ous) Ammonium sulfate crystals – T	*Potassium chlorate – T, E
*Hydrofluoric acid – T	Nickel carbonate – C	Potassium chromate – C, T
Hydrogen gas – F	Nickel(ous) chloride – T, C	Potassium dichromate – R, T, C
Hydrogen peroxide (over 6%) – T, R	Nickel(ous) nitrate – T, C	Potassium ferricyanide – T
Hydrogen sulfide – T	Nickel oxide – C	Potassium ferrocyanide – T
Hydroquinone – T		

Potassium hydroxide (solid) – T, R	*Sodium arsenate – T, C	Strontium nitrate – F
Potassium nitrate – F, E	*Sodium arsenite – T, C	Sudan IV – C
Potassium nitrite (crystals) – F, E	*Sodium azide – T, E	*Sulfuric acid (fuming) – T, R
Potassium periodate – R	Sodium chlorate – F	Sulfuric acid – R, T
Potassium permanganate – T, F	Sodium chromate – T, C	Tannic acid – C, T
*Potassium sulfide – F, T	*Sodium cyanide – T	Tetrabromoethane – T
Propionic acid – F	Sodium dichromate – T, C	Thioacetamide – C, T
n-Propyl alcohol – F	Sodium fluoride – T	Thiourea (thiocarbamide) – C
Pyridine – T, E	Sodium hydroxide solutions – R (purchase of pre-mixed soln. recommended)	*Toluene – T, F
Pyrogallol (Pyrogallic acid) – T	Sodium hydroxide – R	Toluidine – C
Sebacoyl chloride/hexane soln. – F	Sodium nitrate – R, E, T	Trichloroethylene – C, T
Silver acetate – T	Sodium nitrate (granular) – T, F, E (for A. P. Chemistry only)	Uranyl acetate – C
*Silver cyanide – T	Sodium nitrite – C, T, E	Uranyl nitrate – C, F, E
Silver nitrate – T, R	*Sodium peroxide – E	Urethane – C
Soda lime – R	Sodium sulfide – T, F	Vinylite – C
Sodium metal – F, R (max. qty. – 1 yr. demo supply)	Sodium thiocyanate – T	Winkler's solution #2 – R
	Stannic chloride – R, T	Wood's metal – T
	*Strontium – F	Xylene – F, T
		Zinc nitrate (flakes – T, F)

Appendix E

Science Department Chemical Storage Inspection Checklist

This checklist describes the conditions for a science chemical storage area to be in compliance with the Chemical Hygiene Plan for Oklahoma City Public School District. Copies of this report and documentation of necessary corrective actions taken are to be kept by the Chemical Hygiene Officer and the District Safety Department.

School _____ Storage Location _____

Inspection by _____ Date _____

Signature of Chemical Hygiene Officer _____

Date _____

Conditions within storage area: S = Satisfactory, C = Corrective action needed

1. All chemicals are clearly labeled with all appropriate information. _____
2. Chemicals are stored on secure shelving. _____
3. Chemicals are spaced to allow safe storage and removal of chemicals. _____
4. Stored quantities of hazardous chemicals do not exceed a two-year supply. _____
5. The chemicals stored are only those required for science instruction. _____
6. Labeled cabinets are used for storage of flammables and contact hazards. _____
7. Storage area is free of defective containers. _____
8. Hazardous chemicals are not stored above eye level. _____
9. Locked doors secure access to the chemical storage area. _____

10. A fire extinguisher is located in the chemical storage area. _____
11. Materials are available for spill control and cleanup. _____
12. Floor area is free from clutter and provides easy exit from storage room. _____
13. None of the following are stored:
- a. Gasoline _____
 - b. Mercury or mercury compounds _____
 - c. Benzoyl peroxide _____
 - d. Carbon disulfide _____
 - e. Ether _____
 - f. Picric acid _____
 - g. Perchloric acid _____
 - h. Arsenic powder, pentoxide, trichloride, or trioxide _____
 - i. Asbestos _____
 - j. Benzene or benzidine _____
 - k. Chromium powder or chromium (IV) oxide _____
 - l. Lead arsenate _____
 - m. Sodium arsenate or sodium arsenite _____
14. MSDS/SDS sheets are available in a clearly marked location. _____
15. Metal and glass containers of flammables are limited to one gallon in size. _____
16. Glass bottles are limited to one gallon for any of the following chemicals: acetone, amyl alcohol, methyl ethyl ketone, cyclohexane, ethanol, and methanol. _____
17. Chemical storage area and laboratory has adequate ventilation. _____
18. Operation of fume hood is adequate; 60 to 100 linear feet per minute is recommended _____

Remarks: If more room is needed, please attach additional documents.

Appendix F

Chemical Hygiene Plan Checklist

This chemical hygiene plan checklist is for use in Oklahoma City Public School District for annual inspections of science departments to ensure effectiveness & compliance with OSHA Standard 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories. Copies are to be kept by the Chemical Hygiene Officer & the District Safety Department.

School _____ Chemical Hygiene Officer _____

Date _____ Inspection by _____

Item #	Compliance: ✓ indicates compliance with OSHA Standard
--------	---

- | | |
|-------|---|
| _____ | 1. Laboratory use of hazardous chemicals complies with OSHA Standard. |
| _____ | 2. Work is performed on laboratory scale. |
| _____ | 3. Employees are not exposed to substances requiring monitoring as defined by the OSHA Standard. |
| _____ | 4. There is a written Chemical Hygiene Plan as defined by OSHA Standard. |
| _____ | 5. The Chemical Hygiene Plan is capable of protecting employees from health hazards associated with chemicals in the laboratory. |
| _____ | 6. The Chemical Hygiene Plan is readily available to employees, employee representatives, and evaluators. |
| _____ | 7. The Chemical Hygiene Plan indicates specific measures to ensure employee protection in the laboratory including the following: |
| _____ | a. Standard operating procedures relevant to safety and health to be used when working with hazardous chemicals are addressed. |
| _____ | b. Circumstances that require prior approval are addressed. |
| _____ | c. There is documentation of employee information and training at the time of employment and/or new assignment. |
| _____ | d. Employees are given access to a copy of the Chemical Hygiene Plan. |
| _____ | e. The Chemical Hygiene Plan is reviewed in detail with employees at least annually and any new provisions are explained. |
| _____ | 8. Only chemical processes that do not require use of respirators are used. |
| _____ | 9. Employees are provided the opportunity to receive medical attention under the circumstances defined in the Standard. |
| _____ | 10. Chemicals of unknown composition are assumed hazardous and covered in the Chemical Hygiene Plan. |
| _____ | 11. Labels on incoming containers of hazardous chemicals are not removed or defaced. |
| _____ | 12. Chemical Hygiene Plan indicates particularly hazardous chemicals not allowed for laboratory use or storage. |
| _____ | 13. Procedures for removal of unwanted or hazardous chemicals are explained. |
| _____ | 14. The Chemical Hygiene Plan is reviewed and updated at least annually |

Recommended Actions: please attach additional documents

Appendix G

Chemical-Specific Safety Procedures

Reproductive Toxins:

- Reproductive toxins shall be handled only in a hood, using appropriate protective apparel (especially suitable gloves) to prevent skin contact.
- Reproductive toxins shall be properly labeled and stored in well-ventilated areas in unbreakable secondary containers, if possible.
- Notify supervisor/instructor of all incidents of exposure or spills.

High Acute Toxicity Chemicals: (Supplemental rules to be followed in addition to those mentioned above):

- Use and store these chemicals in areas of restricted access that are posted with special warning signs. These areas shall include a hood (with a face velocity of at least 60 linear feet/minute) or other containment device for procedures that may generate aerosols or vapors containing the substance.
- Use gloves, long sleeves and other protective apparel as needed to avoid skin contact. Always wash hands after working with these chemicals.
- Maintain records of the amounts of these materials on hand, amounts used and the names of the workers involved.
- Assure that at least two people are present at all times if a compound in use is highly toxic or of unknown toxicity.
- Be prepared for accidents and spills. Store breakable containers of these substances in chemically resistant trays. Cover work and storage surfaces with removable, absorbent, plastic backed paper.
- If a major spill occurs outside the hood, evacuate the area; assure that cleanup personnel wear suitable protective apparel and equipment.
- Thoroughly decontaminate or incinerate contaminated clothing or shoes. If possibly, chemically decontaminate by chemical conversion.
- Store contaminated waste in closed, suitably labeled, secondary containers (for liquids, plastic bottles half-filled with vermiculite).

Select Carcinogens: (Further supplemental rules to be followed, in addition to all these mentioned above):

- Conduct all transfers and work with these substances in a designated area--a restricted access hood, glove box or portion of a lab designated for use of highly toxic substances, for which all people with access are aware of the substance being used and necessary precautions. The designated area shall be conspicuously marked with warning and restricted access signs. Prepare a plan for use and disposal of these materials and obtain approval of the appropriate lab supervisor or instructor.

- All containers of these substances shall be properly labeled with identity and warning labels.
- Store containers of these chemicals in ventilated, limited access areas in appropriately labeled, unbreakable, chemically resistant, secondary containers.
- If using toxicologically significant quantities of a select carcinogen on a regular basis (3 times per week or more), consult a physician concerning desirability of regular medical surveillance.
- Use a wet mop instead of dry sweeping if the toxic substance was a dry powder.
- When using a positive pressure glove box, thoroughly check for leaks before each use. Trap exit gases or filter them through a HEPA filter and then release into the hood.
- Use chemical decontamination whenever possible; ensure that containers of contaminated waste (including washings from contaminated flasks) are transferred from the controlled area in secondary container under the supervision of the laboratory supervisor/instructor.
- Decontaminate any equipment, including glassware, in the hood before removing them from the controlled area. Decontaminate the controlled area before resuming normal work there.
- On leaving the area, remove protective apparel and wash hands, forearms, face and neck.

Flammables:

- Never heat flammable liquids with an open flame or hot plate. Use a heating mantle, steam bath or hot water bath.
- Never use or store flammable chemicals near any source of ignition spark or open flame.
- Handle solvents in an exhaust hood or a well-ventilated area.
- Ground containers when transferring from one container to another if the potential for sparking exists.
- Do not store large quantities of flammable reagents in the laboratory.
- Store flammable liquids in appropriate safety cabinets and/or safety cans.

Appendix H

Safety Precautions and Operation of Portable Fume Hoods

Safety

1. See the Chemical Guide that came with your model to verify the chemical(s) being used are compatible with the hood filters. If you do not have an Operation Guide check the company's webpage to download a new manual.
2. Do not use open flame inside the hood.
3. Ensure pre-filters are installed prior to use. Change the pre-filters quarterly.
4. Use care when installing Filter Cells, units are heavy.
5. Exhausted carbon filters have absorbed vapors from chemicals used in the hood and therefore are chemical waste.
6. Users need to be familiar with the operating procedures for the hood.
7. The Chemistry Lab ventilation system must be operating while using the hood.
8. Abnormal odors may indicate that the hood filters may need to be changed.
9. The hood is not intended for highly toxic vapors, unknown reactions, hazardous particulates or experiments generating high levels of contaminants.
10. Minimize the quantity of the chemical(s) used in the hood.
11. Adjust the sash position to the 100 lfps setting for chemicals with TWA's below 50 ppm.
12. Leave Blower on for at least 1 minute after work in the enclosure has been completed.
13. If a chemical is spilled inside the hood, leave the blower running until all traces of the chemical has been removed.
14. Make sure the Filter Cells are installed prior to using the hood.
15. If the hood blower fails during use, terminate the experiment and evacuate the Lab.
16. For manufacturer's assistance with the hood or filter selection, contact your manufacturer's webpage to get assistance or up to date phone numbers to call.

Operating the Hood (if hood is equipped)

1. Note: Refer to the hood instructional manual for routine maintenance requirements (see Appendix I) which are dependent upon amount of use and type of chemicals used within the hood.
2. To start the hood, turn on the blower with the switch
3. Observe for error messages
 - a. AIR FLOW ERROR – Indicates low air flow

- b. SENSOR 1 ALARM – Sensor in carbon filter detected a high level of organics
- c. SENSOR 2 ALARM – Indicates high level of organics in the exhaust ducting
- d. SENSOR WARM-UP – Sensor warming up.
- e. MEMORY ERROR - indicates filter hours and other stored times were not stored correctly in memory

Appendix I

Routine Maintenance of Portable Fume Hoods

Monitoring and changing the filters is the primary maintenance required with this enclosure. Weekly maintenance shall be performed by classroom teacher where as Monthly shall be performed by Chemical Hygiene Officer (CHO). The teacher can do quarterly pre-filter changes only if they have been trained by the CHO.

Under normal operations, your portable fume hood will require little routine maintenance. The following maintenance schedule is recommended:

Weekly

- Using an appropriate glass cleaner, clean the sash and sides. Wipe down the interior surfaces of the unit using a damp cloth.
- Clean the exterior surfaces of the unit, particularly the front and top to remove any accumulated dust.

Monthly

- Test filter condition using a gas detector tube at intervals of 20% of the total estimated time. The exception to the 20% recommendation is formaldehyde or any carcinogen or suspected carcinogen. These hazardous chemicals must be checked at least every 10% of the total estimated time. Gas detector tubes for the specific chemicals that are being used in the enclosure can be obtained from your laboratory supply dealer.
- Check face velocity on the HEPA filtered models. Change HEPA filter when face velocity drops below 90 feet per minute.
- Replace filter when chemical breakthrough is indicated by odor, time, detector tube, vapor sensor or for some chemicals, analytical instrumentation.
- The Safety First Vapor Sensor does NOT eliminate the need to sample with detector tubes. The sensor is capable of detecting organics in the range of 50 ppm. Your chemicals may have TWA's less than 50 ppm.
- See "Filter" section of manual.

Quarterly

- Change the pre-filters every three months or more frequently if dusty conditions exist.