Clark County School District
K–12 Science Safety Manual

Clark County School District
Las Vegas, Nevada

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K–12 Science Safety Manual

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INTRODUCTION

The purpose of the *Clark County School District K-12 Science Safety Manual* is to promote safety awareness and encourage safe work practices in all science classrooms. This manual will provide guidelines to follow in promoting safe practices in science classrooms and laboratories. Although these guidelines are applicable to all research, teaching, and academic laboratories, the science classroom may require more specialized rules that apply to specific materials, equipment, and activities.

The *Clark County School District K-12 Science Safety Manual* has been prepared to help science teachers and administrators understand and avoid circumstances in which accidents might occur in the science laboratories or on field trips and outdoor education experiences. The suggestions contained in this manual are generally agreed upon as standard procedures within the K-12 educational community. However, no manual can completely describe the actions for ensuring safety under all conditions and in all situations. Therefore, the contributors cannot be responsible for errors in the manual or for any consequences arising from the use of the information published herein.

IMPORTANCE OF SAFETY

Laboratory activities and demonstrations represent an essential part of effective science instruction. Students more fully understand concepts related to science when they participate in or observe learning activities involving laboratory experiments and demonstrations.

Although many science activities present potential hazards, a carefully planned and conducted laboratory science instructional program can greatly reduce the likelihood of accidents. When students strictly adhere to standard safety precautions, they are less likely to be harmed. Knowing about possible hazards and taking precautions are the basis for creating a safe learning environment. Teachers should conduct all laboratory activities or demonstrations prior to classroom implementation to determine potential hazards.

The National Science Teachers Association (NSTA) promotes extensive use of inquiry laboratory investigations and field trips in science instruction and urges that school districts and teachers share the responsibility for establishing safety standards and ensuring compliance. A safe science laboratory experience is a shared endeavor.

The laboratory science instructional program should be carefully planned and conducted to ensure maximum safety conditions for all personnel. Teachers who have particular concerns about safety conditions related to facilities, equipment, supplies, curriculum, and classroom occupant load should notify the site administrator.

SAFETY IS A SHARED RESPONSIBILITY

The science classroom is a good place to begin learning the fundamentals of science safety. Science students should not expect teachers to shoulder the entire responsibility for a safe learning environment in the science classroom and laboratory. Each student can contribute to the safety of others and help maintain an atmosphere of safe learning by accepting a few basic responsibilities. Students have a responsibility to themselves and their classmates to learn and observe safety practices in all participatory science activities. In addition, students should adopt positive attitudes about the need for safety in a laboratory setting.

Parents and other visitors are welcome in the science laboratories, just as they are in other classrooms. School procedures for visitors should be followed. Guests should wear protective goggles and follow the same safety procedures expected of students. Parents are encouraged to support the school science program and to reinforce the curricular objectives of the course through family activities, museum visits, and field trips.

GENERAL INFORMATION

SAFETY PRACTICES COMMON TO ALL SCIENCE LABORATORIES AND CLASSROOMS

- Safety in the science classroom should be taught and reinforced throughout the year. The teacher should make notations of each instructional act regarding safety in daily lesson plans and maintain a record (log) for each class to document the specific topics on safety instruction and the dates on which they were taught.

- The teacher must be fully acquainted with the emergency procedures for the site.

- Thorough instruction on necessary safety procedures, including appropriate disposal of excess or waste chemicals, must precede each laboratory activity.

- Teachers and students should be familiar with the operation of all fire extinguishers in the classroom. Labels on the extinguishers contain directions for their use.

- Teachers should be familiar with the location of all master controls for utilities, especially the master valve in each room for the gas outlets.

- Laboratories and storage rooms should always be locked when not in use. Students are not permitted in science storage or prep rooms.

- Chemical cabinets should remain locked at all times.

- The custodial staff should be alerted to general hazards they may encounter in science areas and to special situations that arise.

- There should be no use of explosive, volatile, or flammable materials in any containers that would create a potential for ignition and/or explosion. Small quantities of such materials may be used in glass test tubes and beakers where such use is part of an appropriate laboratory exercise.

- Teachers should set an example for the students. For example, teachers should always wear goggles when students are required to do so. Teachers should follow all safety regulations and constantly be alert and remind students of hazards. Students not adhering to the rules should not be allowed to participate until it is assured there will be no further infractions.

SAFETY AND LOSS CONTROL

Please become familiar with CCSD Regulation 7310. The Clark County School District recognizes that a safety program for students and employees is necessary to accomplish its public education mission. It is recognized that loss control management is needed to reduce property damage, bodily injury, environmental pollution, and legal actions. Safety and loss control is a shared responsibility. Clark County School District employees and students must work together at all levels to maintain a safe work and educational environment.

RISK MANAGEMENT

Laws and regulations place direct responsibility on teachers, administrators, and school board members for the safety of students in school, including in science classrooms. Therefore, it is important to plan preventive steps that will protect students and teachers, minimize or alleviate accidents, and reduce both individual and district liabilities.

Such steps include effective safety instruction, careful supervision of all activities, and proper maintenance of laboratory and classroom equipment. Courts examine the circumstances and conduct of the responsible individuals to ascertain whether their conduct, actions, judgment, and behavior were reasonable and prudent under the given circumstances. Through an analysis of the actions taken by the school, the school district, and the individual, the court determines the degree of responsibility that can be attributed to the parties involved.

Posting safety guidelines and procedures is a recommended practice for science classrooms. Specific safety instruction and testing are highly recommended as an integral part of every science classroom procedure. This handbook includes suggested safety procedures and a student safety test that may be used in the teaching of various scientific disciplines. The science teacher should continually remind students of both general and specific hazards before the performance of laboratory activities in which any element of danger might exist.

If a textbook or laboratory manual specifies a dangerous procedure, which neither the students nor the instructor can safely carry out, then the teacher must ensure that the procedure is not performed, but replaced with a safe one. Students should not be allowed unsupervised access to potentially dangerous materials or equipment and should be under continual supervision in all laboratory situations. Monitoring or supervising a laboratory setup during passing periods is an essential practice.

The checklists included in this manual will also help ensure that the safety features of the classroom/laboratories, preparation areas, and storerooms are present and in proper working condition. These checklists were designed to assist department chairs and administrative staff in evaluating the effectiveness of facilities and established procedures regarding accident prevention. They are not intended as a purchasing standard.

A Chemical Hygiene Plan has been written for the Clark County School District (see Appendix J). Compliance with this plan helps to ensure that anyone working in a laboratory setting will be protected from any chemical exposure that exceeds permissible exposure limits. Teachers using any chemicals should review this document to ensure that their laboratories are following these safety guidelines.

ELEMENTARY SCHOOL SCIENCE SAFETY

Elementary school teachers should become familiar with appropriate sections of this manual. All science teachers should facilitate only labs and activities that come from current, up-to-date curriculum guides, adopted textbooks, or FOSS kits. Never demonstrate or allow students to use a procedure that you have not performed in advance.

The K-5 Science and Technology Handbook contains activities correlated to the *Curriculum Essentials Framework.* Elementary school activities provide an essential opportunity for students to learn about safety. While it may be tempting to relax safety rules when the danger appears minimal, keep in mind that students are creating safe habits that will be needed as they progress through their science education.

CLASSROOM MAINTENANCE

Keep laboratory classroom floors dry at all times. Immediately attend to spills of chemicals/water, and notify lab participants of potential slipping hazards. Free and clear access to all safety equipment should be maintained. Keep paperwork, displays, posters, etc. away from the experiment area.

If experiments are to be continued unattended overnight, place a note next to the experimental apparatus indicating the chemicals involved, your name, and a number where you can be reached in case of an emergency.

GIFTS

Please reference CCSD Regulation 3241 regarding acceptance of gifts. Gifts of scientific equipment and supplies should be carefully inspected before being accepted by individual school sites. If the donation is out-dated, dangerous, or not useful for the classroom, do not accept it. Chemicals, in any form, should never be accepted. It is strongly suggested that schools do not accept donations of equipment from universities or lab-based businesses because of possible exposure to radioactive materials.

EMERGENCY INFORMATION

EMERGENCY PROCEDURES (GENERAL)

In the event of an emergency, contact the school office immediately and follow all school procedures. A variety of emergency response departments can then be alerted to your situation.

Do not cover windows of laboratory classroom doors, except for special experimental requirements. This allows staff to notice if anyone is in need of emergency assistance.

Be familiar with the location and use of the following safety devices:

- Safety shower
- Fire blanket
- Eye wash station
- Fire alarm
- Call button
- First aid kit
- Fume hood
- Spill cleanup kit
- Fire extinguisher

FIRST AID

Under normal circumstances, the school nurse or FASA (First Aid Safety Assistant) will direct the treatment of any illnesses, injuries, or other health problems of students. In the case of any emergency, school procedures should be followed. It is important to get qualified help as soon as possible. Measures should be taken to reduce any anxiety or fear that the injured student or other students may experience. A written accident report must be given to the school site administrator when any such incident occurs.

- **DO** be cool, calm, and collected.
- **DO** follow the school's emergency procedures.
- **DO** make a prompt, complete, and accurate written report of the incident.

- **DO NOT** diagnose.
- **DO NOT** give medical advice.
- **DO NOT** treat injuries that happened at home.
- **DO NOT** move the person.
- **DO NOT** try to arouse an unconscious person.

Some situations will require immediate action by the teacher:

CARDIOPULMONARY RESUSCITATION (CPR)

This procedure must be administered **only** by someone trained and certified according to the standards of the American National Red Cross or the American Heart Association.

CHEMICAL BURNS

If hazardous chemicals should come into contact with the skin or eyes, follow the first aid procedures below. Do not become a victim; wear gloves and safety goggles to protect yourself when assisting someone covered in chemical(s). **Direct a student to notify the office while you are attending to the victim.**

Skin

- Remove victim's clothes; don't let modesty stand in the way. Remove victim's shoes as chemicals may collect in the shoes.
- Rinse the area with large quantities of water for at least 15 minutes (sink, shower or hose).

Eyes

- Open eyelids forcibly to ensure effective washing behind the eyelid.
- Wash from the nose out to the ear. This will avoid washing chemicals back into the eye or into an unaffected eye.
- Flood eyes and eyelids with water/eye solution for a minimum of 15 minutes.

CHEMICAL INGESTION

Call the office IMMEDIATELY. Try to identify what the victim has ingested. Have this information available for emergency personnel. MSDS information should be made available when applicable.

CHEMICAL INHALATION

- Evacuate the area and move the victim into fresh air.
- Notify the office.

FIRE ON A PERSON

Direct a student to notify the office while you are attending to the victim.
If a student's clothing catches fire, the student should not run. He or she should stop, drop, and roll on the ground immediately while another person brings the fire blanket. Then the burn victim should roll up in the blanket to smother the flames. The blanket should be held close at the neck to force the flames away from the head and hair while the student is rolling up in the blanket. Water, if available, may be used with the fire blanket to extinguish the flames. **DO NOT use a fire extinguisher on a person because**

serious chemical reactions or frostbite (with the use of a CO_2 extinguisher) may result from such use.

FIRE PREVENTION

Instructors need to be aware of ignition sources in the laboratory area. This includes open flames, heat, electrical equipment, or other sources of sparks. Flammable reagents should be purchased in the smallest quantities possible. Many substances and types of chemical reactions involved in science programs present potential fire hazards.

The teacher must anticipate the causes of fires and be ready to act swiftly in the event that a fire should occur despite preventative measures taken. In the event of a fire, teachers should follow the school fire evacuation plan.

Storage

- Incompatible reagents should not be stored together.
- Flammable supplies must be stored in appropriate safety cabinets and/or safety cans.
- Flammable liquids are not to be stored in standard refrigerators; an explosion-proof refrigerator should be used.

Electricity

- All electrical outlets should be grounded and should accommodate a three pronged plug.
- Instructors should make certain that all electrical cords are in good condition.

Open Flame Use

- When an open flame is used in the classroom, caution students to stay well away from that flame.
- Never reach across the flame area.

In Case of Fire

- In the event of a classroom fire, the teacher should conduct a fast, orderly evacuation of the room following the site evacuation plan. The fire should be reported immediately, and control measures taken if the fire is localized and not presenting imminent danger.
- Both teacher and students should know the location of the nearest fire alarm, fire blankets, and extinguisher.
- In the event that hair or clothing becomes ignited, douse with water.
- A fire blanket can be used to smother the flaming area if water is not available in sufficient quantity.
- In an electrical fire, pull the plug if this can be done without sustaining a burn (cord might be hot) or becoming part of the circuit. Do not use water. It is a conductor of electrical current.

A fire blanket is used in the event of fire involving clothing.
A fire blanket should be located in every science classroom and in every science prep room.

Victims should stop, drop, and roll immediately on the floor to minimize inhalation of smoke or hot gases. They should be assisted in rolling up in the fire blanket, starting with the upper portion of the body, forcing any flames away from the head, yet making certain that the head is free.

The most common causes of fires in science laboratory activities are:

- Failure to understand the nature and potential hazards of the supplies or equipment being used;
- Careless handling of supplies or equipment; and
- Failure to follow directions and lab procedures

EARTHQUAKE PREPAREDNESS

The Las Vegas Valley has risk of experiencing a moderate size earthquake. Although Clark County schools are structurally built to withstand an earthquake of magnitude 7.0, the shaking would cause a tremendous amount of glass breakage and other types of damage within the classroom.

The following preventive measures are recommended:

- Toxic chemicals should be stored on low shelves and in chemical-proof containers.
- Chemicals cannot be stacked on top of each other.
- The school must keep an annual inventory of what is in the storeroom and in each individual chemical cabinet.
- Emergency procedures should be documented and posted at every school.
- Disaster drills should be conducted according to District guidelines.

Science preparation areas that are properly managed and have good storage practices can ride out strong earthquakes. Shelving that is secured to the wall and has a retaining lip on the front edge can prevent items from falling off during the lateral motion of an earthquake. Cabinets should have doors that can be latched so that the ground motion does not cause the doors to swing open, emptying the contents into the classroom. Battery-operated emergency lights should clearly illuminate chemical storage areas. These earthquake safety measures should augment the school's general emergency/ disaster plans.

Teachers are encouraged to use the checklist on page 10 to help identify common nonstructural earthquake hazards that can be reduced or eliminated at little or no cost. These hazards include equipment, furnishings and fixtures in the classroom that must be securely mounted or restrained in the event of ground motion. A special check of all hazardous/toxic material storage should be made. In the event of an earthquake, breakage of containers containing dangerous material can release gases and other toxic material

into the school environment. After identifying the nonstructural hazards in the classroom, laboratory, stockroom, and preparation room, the school administration will determine the most effective method to mitigate those risks.

TEACHER CHECKLIST FOR EARTHQUAKE PREPAREDNESS		
YES	**NO**	Are freestanding cabinets, lockers, bookcases, cupboards, storage racks, and wall shelves secured to a structural support?
YES	**NO**	Do tall industrial storage racks have adequate bracing?
YES	**NO**	Are racks that are significantly taller than they are wide connected to the concrete slab by large anchor bolts?
YES	**NO**	Is the television monitor securely fastened either to a securely fastened platform or to a cart with a low center of gravity and lockable wheels?
YES	**NO**	Do desktop computers have secured monitors?
YES	**NO**	Are heavy or sharp wall decorations securely mounted (with closed eye hooks, for example)?
YES	**NO**	Are heavy objects stored above head level restrained or relocated?
YES	**NO**	Is specialized heavy laboratory equipment (e.g., an autoclave) on a countertop secured to protect it against sliding off and falling?
YES	**NO**	Are fire extinguishers securely mounted?
YES	**NO**	Are cabinets equipped with heavy-duty latches (magnetic catches can pop open too easily)?
YES	**NO**	Are display cases or aquariums protected against overturning or sliding off tables?
YES	**NO**	Are emergency battery-operated lights protected from falling off shelf supports?
YES	**NO**	Are hanging plants, movie screens, or displays fastened with closed eye hooks and positioned so that they would not hit a window if they were to swing?
YES	**NO**	Have inventories been made of hazardous chemicals so that someone can check the chemicals after an earthquake?
YES	**NO**	Are compressed gas cylinders tightly secured with a nylon strap or strong chain near the top and near the bottom or stored on a rack designed to restrain cylinders?
YES	**NO**	Are laboratory chemicals on shelves restrained by a wire, lip, or other barrier?
YES	**NO**	Have chemicals been stored by compatible groups to reduce the likelihood of their mixing and causing reactions?
YES	**NO**	Have chemicals been stored in plastic or other unbreakable storage containers?
YES	**NO**	Have the windows in the classroom/laboratory or stockroom been equipped with safety glass or covered with protective film?

SAFETY ON FIELD TRIPS

Field trips afford unique learning opportunities, but often include hazards not encountered in the classroom laboratory. Field trips should be carefully planned and should include provisions for transportation, protection against on-site hazards, and supervision.

The teacher should visit the site beforehand to assess the hazards so that they can be considered in the pre-trip orientation and in communications with parents or guardians. Permission slips should be completed and signed by parents or guardians. Please check with your school site administration regarding proper procedures.

SUPERVISION

The nature of the field trip activity and the environment will dictate supervision needs. Pre, during, and post activities should be assigned and planned in advance. Check with your Area Service Center and the field trip site contact to determine the appropriate adult/student ratio.

A first-aid kit is required whenever a group takes a trip away from school. If the field trip is conducted in an area known to be infested by poisonous animals, precautions should be taken. Students should be informed of appropriate kinds of clothing to wear on a particular field trip. Students should be instructed to wash their hands and faces with a strong soap immediately after any exposure to hazards, such as poisonous plants. Special precautions should be taken when trips are conducted on or near deep water. When trips are conducted in areas in which participants are likely to come into contact with animals or organisms that spread diseases, such as the Hanta virus and Lyme disease, other precautions must be followed.

The Hanta virus is spread by rodents and is found around and in primitive, abandoned, or seasonally used buildings in Nevada and other southwestern states. The virus is often inhaled with dust in which saliva, urine, or feces from rodents have intermingled. Students and teachers should not touch or collect owl pellets because of the possible consumption by the owls or infected rodents. Consult your county environmental health department for decontamination procedures if there is a chance of coming in contact with infected rodents.

Lyme disease is more prevalent in mountainous regions and temperate climate zones. The spirochete which causes the infection is injected during the bite of certain ticks and may also be transmitted to other mammals (including pets) and birds. Students should take special precautions, such as wearing protective clothing and checking their clothes and body frequently for ticks. Students should shower as soon as they return home and carefully check for ticks again at that time.

FIELD TRIP TIPS

- **Carry water** – 1 gallon/person/day. In the heat, soda is not a suitable replacement for water. Drinks such as sports drinks are good because they replenish minerals and carbohydrates.
- **Keep cool** –Cooling bands soaked in water and spray bottles with fans attached can keep a person cool by evaporation of the moisture.
- **Protection from the sun** – Students should be advised to wear protective clothing, including long pants, long sleeves, close-toed shoes, sunglasses, and hats. Students should be advised to wear sunscreen.
- **Protection from insects** – Protective clothing is necessary. Wear gloves and shoes, especially when working in the dirt or around plants. Insect repellants can help, but citrus-scented ones will attract bees. Please note: the most effective insect repellant products contain the highest percentage of DEET.
    - **Biting or stinging ants:** Get away, brush them off, remove clothing as necessary, and treat bites with a cold and soothing ointment. If the possibility exists that these might be imported fire ants, it is important to get a sample of them and submit it to the Department of Agriculture.
    - **Bees:** Stay away from beehives. Getting closer than 75 feet may cause a reaction from the Africanized honey bee.

  Note: The stings of both imported fire ants and Africanized honey bees can cause a small percentage of people to go into anaphylactic shock. If this happens, seek medical attention immediately.
- **Protection from Cacti** - Be careful when walking or hiking near cacti. If contact occurs remove clothing as soon as practical; remove small thorns if possible. Thorns from cholla and ocotillo are considered puncture wounds, and should only be removed by medical personnel.
- **Dealing with allergies** – There are many things in the desert that can cause allergic reactions such as dust, pollen, and pollutants. Be aware of students with allergies.
- **Communication methods** – Cell phones are helpful, but in isolated places, they are only as good as the batteries and the availability of coverage. Two-way radios are also invaluable. If needed, carry GPS units.
- **Do not overexert** – Frequent, short rest periods conserve energy and allow everyone to keep going in the heat.
- **Be careful around hazards** - Take great care of using chemicals in the heat. Keep them away from power equipment. Be careful when handling equipment and tools that have been placed in the sun; they can be extremely hot.
- **Heat exhaustion:** Symptoms of heat exhaustion may include feeling clammy, weak and nauseous. Keep calm, stay in the shade, offer fluids, and seek medical attention.
- **Being stranded:** Students should never be allowed to explore alone. Be certain that the field trip destination, leaving and arrival times, and routes are clearly communicated to the administration. If you should find yourselves stranded, it is best to stay by the vehicle and wait for help to arrive.

- **Injury:** A first aid kit should be carried with the group. Stabilize the victim and get help.
- **Snake bites:** Constrict the extremity, keep calm, and get help.

It is always a good idea to consult additional resources specific to the field trip environment.

POISONOUS PLANTS

Teachers should be prepared to caution students regarding the hazards of poisonous plants. Special attention should be given to poisonous plants or plants with poisonous parts. These include plants that are part of the school landscaping, part of a classroom unit of study, and/or may be encountered during planned field trips. Since not all plants have been thoroughly researched for their toxicity, common sense rules would be:

- **NEVER** place any plant part in the mouth.
- **NEVER** rub any sap or fruit juice into the skin or on an open wound.
- **NEVER** inhale or expose your skin or eyes to the smoke of any burning plant or plant part.
- **NEVER** pick strange wildflowers or cultivated plants unknown to you.
- **NEVER** eat food after handling plants without first washing hands thoroughly.

Any part of a plant may be relatively toxic, even to the point of fatality, depending on the weight of the person and the amount of the plant ingested. Many seeds are coated with hormones, fungicides and insecticides. Some of these coatings may cause allergic responses. Some may be deadly when inhaled to any degree or accidentally ingested. Teachers purchasing seeds from dealers for experiments should investigate the presence of any such coating or sprays and ask the dealer if the seeds have been chemically coated.

The following list of plants was supplied by the University of Nevada Reno Cooperative Extension and should not be taken as "all inclusive." If plants are used in the classroom and their toxicity is unknown, contact the UNLV Cooperative Extension at (702) 257-5555.

Poisonous Plants

Common Household Plants:
Diffenbachia – leaves and stems
Philodendron – leaves and stems

Common Yard Plants:
Amarylis – bulb
Belladonna
Carolina Jessamine – all parts
Castor Bean – all parts
Chinaberry – seeds, bark and flowers
Common Privet – berries
Delphinium – leaves
English Ivy – leaves and berries
Elderberry – wood and bark
Fire Thorn
Holly berries
Jerusalem Cherry – fruits
Lantana – green berries are toxic
Oleander – all parts
Peach – leaves (hydrocyanic acid)
Poinsettia – primarily leaves
Pyrocantha
Texas Mountain Laurel (Mescal bean) – seeds

Other Common Plants:
Bittersweet – berries, juice
Black Nightshade – juice, leave
Bleeding Heart – leaves, tubers
Burning Bush – leaves
Columbine – berry
Dogwood – fruit
Dumb Cane - all parts
Foxglove – leaves
Golden Chain – leaves, seeds
Horse Chestnut – leaves, nuts
Hydrangea – leaves
Impatiens – stem, leaves
Iris – underground stem
Lily-of-the-Valley – all parts
Lupine – leaves, pods, seeds
May apple – roots
Milkweed – leaves, stems
Mistletoe-Berries
Mock Orange – fruit
Monkshood – all parts
Narcissus – bulb
Pinks – seeds
Potato – seeds, sprouts
Rhubarb – leaves
Sacred Datura (Western Jimson-Weed or Thorn Apple) – stem, leaves
Wild Black Cherry - leaves
Yew – leaves, bark, seeds

Plants that are Irritants (causing a rash):

Ailanthus – leaves
Milkweed – milky sap
Nettle – leaves
Poinsettia – milky sap
Primrose – leaves, stems
Rubber Plant – milky sap
Thistle – leaves
Trumpet Vine – flowers

Contact Poisons:
Poison Ivy – all parts
Poison Oak – all parts
Poison Sumac – oil from leaves

Here are some good sources of information:

Desert Survival Handbook
Poisonous Dwellers of the Desert

GENERAL LABORATORY SAFETY

LABORATORY CLASS SIZE

Teachers are encouraged to work with their administrators to identify and alleviate potential hazards due to overcrowding and limitations in facilities. The objective should be to guarantee the safest possible environment in which to conduct experiments without reducing the number or quality of activity-based science lessons. When making decisions about class size with administrators, the following factors should be considered:

- The space required for each student to perform experiments safely.
- The safety features present in the design of the facilities or space.
- The level of maturity and safety knowledge students bring to the science laboratory.
- The nature and degree of hazards that may be encountered with the activity.

LABORATORY SAFETY AWARENESS

Everyone working in and around the science classroom should be alert to unsafe conditions and actions. The teacher should call attention to hazardous situations and address corrections. This should include student behavior during labs. Mature and responsible student behavior must be maintained during any laboratory experiment or demonstration.

All laboratory equipment should be in proper working condition. All safety equipment should be regularly inspected to make sure that it is working properly. Proper notification should be made to correct non-functioning laboratory equipment. All storage areas should be properly labeled. Chemicals should be stored in accordance with guidelines established in the Chemical Hygiene Plan, and Materials Safety Data Sheets (MSDS) should be current. The date of receipt should be identified. No unmarked containers should be in the classroom or storage area. A separate refrigerator should be maintained for laboratory experiments or supplies. **No food should be stored with laboratory materials.**

The instructor should be familiar with the appropriate measures to be followed when someone in the lab is working with or exposed to the following:

- Corrosive chemicals
- Radioactive materials
- Compressed gases
- Toxic chemicals
- Reactive chemicals
- Flammable substances

PERSONAL SAFETY FOR TEACHERS AND STUDENTS

Respiratory and Body Protection

- Fume hoods should be used whenever appropriate.
- Laboratory coat/apron should be worn in the laboratory classroom.
- Gloves should be worn as needed.
- Eye protection should meet all state and federal standards.
- Safety goggles should be worn at all times in the laboratory classroom.
- Face shields should be used in conjunction with goggles when deemed necessary by the teacher.
- Goggles or safety glasses devices should be stored in an easily accessible germicidal or ultraviolet storage cabinet for sterilization when not in use.
- Safety shields should be used for group protection from splash and impact during all demonstrations. Teacher and students should also wear goggles during such experiments.

Potential Eye Hazards: Eye protective devices should be provided for participants and observers during, but not limited to, the following situations:

- Operation of power tools
- Operation of centripetal devices
- Projectile and collision demonstrations
- Handling of elastic material under stress; (e.g., springs, wires, rubber)
- Working with or igniting explosive or implosive devices or substances
- Working with hot, molten metals
- Hammering, chipping, or grinding of rocks, minerals, and metals
- Cutting, heating or breaking glass
- Pouring, pumping, or dispensing corrosive substances
- During dissection
- Heating or electrolysis of chemicals
- Generation of toxic or potentially explosive gases
- Mixing chemicals that react violently
- Preserving and staining of biological specimens
- Cleaning and sterilizing with irritating or corrosive substances, including ammonia, detergents, or solvents

Personal Hygiene

- Wash hands after any laboratory activity.
- Never use the mouth to pipette chemicals.
- Avoid having long hair, loose sleeves/cuffs, rings, bracelets, etc., in close proximity to open flames or operating machinery with moving parts.
- Keep exposed skin covered. Shorts, skirts, or open-toed shoes should not be worn in the laboratory classroom.

SCIENCE REGULATIONS FOR TEACHERS

- Understand each science laboratory or field investigation in advance.
  - Carefully read and scrutinize all investigations and activities for safety procedures and materials the students will be handling.
  - Read and understand the information on Materials Safety Data Sheets (MSDS) relating to chemicals or other hazardous materials that will be used in the laboratory.
  - Seriously consider all the hazards discussed in the MSDS and determine if the chemicals are safe for students to use. Consider substitute chemicals or procedures.
  - Perform a trial laboratory experience if the investigation has not been done before.
  - Get advice from the Department Coordinator or other experienced teachers.
- Teachers and students must wear protective eyewear and clothing when appropriate.
- Assign pre-laboratory activities before taking students into a laboratory setting.
- Discover all safety precautions in the investigation, and answer questions and concerns before beginning the activity.
- Maintain order and discipline during the activity. Safety rules must be obeyed by all students.
- Label all chemicals correctly and clearly.
- Monitor the laboratory room or field site. Work with students to correct any procedure or behavior that is not safe. Students should promptly clean up their areas while wearing safety goggles.
- If an accident occurs, do not wait to write a report of what caused the accident, injuries, action taken, and results. A more accurate description can be made soon after an accident occurs.
- Do not leave laboratory investigations for substitute teachers.
- Demonstrations involving potentially explosive substances in a bottle, beaker, or test tube should not be performed.
- Develop mandatory safety rules for students.

SCIENCE REGULATIONS FOR STUDENTS

While working in the science laboratory, the teacher will have certain important responsibilities that do not apply in other classrooms. The teacher and student will be working with materials and apparatus which, if handled carelessly or improperly, have the potential to cause injury. A science laboratory can be a safe place in which to work if the teacher and students are prepared, alert, and cautious.

These procedures will be followed:

- Report any accident to the teacher immediately, no matter how minor, including reporting any burn, scratch, cut, or corrosive liquid on skin or clothing.
- Prepare for each laboratory activity by reading all instructions before coming to class. Follow all directions implicitly and intelligently. Make note of any modification in procedure given by the teacher.
- Any science project or individually planned experiment must be approved by the teacher.
- Use only materials and equipment authorized by the teacher.
- Inform the teacher immediately of any equipment not working properly.
- Clean up any non-hazardous spill on the floor or work space immediately.
- Wear appropriate eye protection, as directed by the instructor, whenever working in the laboratory. Safety goggles MUST be worn during hazardous activities involving caustic/corrosive chemicals, heating of liquids, and other activities that may injure the eyes.
- Students with open skin wounds on hands must wear gloves or be excused from the laboratory activity.
- Never carry hot equipment or dangerous chemicals through a group of students.
- Check labels and equipment instructions carefully. Be certain correct items are used in the proper manner.
- Be aware if the chemicals being used are hazardous. Know where the material safety data sheet (MSDS) is and what it indicates for each of the chemicals being used.
- Never taste anything or touch chemicals with the hands, unless specifically instructed to do so.
- Test for odor of chemicals only by waving your hand above the container and sniffing cautiously from a distance (called wafting).
- Eating or drinking in the laboratory or from laboratory equipment is not permitted.
- Use a mechanical pipette filler (never the mouth) when measuring or transferring small quantities of liquid with a pipette.
- When heating material in a test tube, do not look into the tube or point it in the direction of any person during the process.
- Never pour reagents back into bottles, exchange stoppers of bottles, or lay stoppers on the table.
- When diluting acids, always pour acids into water, never the reverse. Combine the liquids slowly while stirring to distribute heat buildup throughout the mixture.

- Keep hands away from face, eyes, and clothes while using solutions, specimens, equipment, or materials in the laboratory. Wash hands as necessary and wash thoroughly at the conclusion of the laboratory period.
- To treat a burn from an acid or alkali, wash the affected area immediately with plenty of running water. If the eye is involved, irrigate it at the eyewash station without interruption for 15 minutes. Report the incident to the teacher immediately.
- Know the location of the emergency shower, eyewash and face wash station, fire blanket, fire extinguisher, fire alarm box, and exits, and how to properly use them.
- Know the proper emergency drill procedures.
- Roll long sleeves above the wrist. Long, hanging necklaces, bulky jewelry, and excessive and bulky clothing should not be worn in the laboratory.
- Confine long hair during a laboratory activity.
- Wear shoes that cover the toes in the laboratory. Sandals are not allowed.
- Keep work areas clean. Floors and aisles should be kept clear of equipment and materials.
- Light gas burners only as instructed by the teacher. Be certain no volatile materials (such as alcohol or acetone) are being used nearby.
- Use a burner with extreme caution. Keep the head and clothing away from the flame and turn it off when not in use.
- Use a fire blanket (stop, drop, and roll) to extinguish any flame on a person.
- Dispose of laboratory waste as instructed by the teacher. Use separate, designated containers (not the wastebasket) for the following:
  - Matches, litmus paper, wooden splints, toothpicks, etc.
  - Broken and waste glass
  - Rags, paper towels, or other absorbent materials used in the cleanup of flammable solids or liquids
  - Hazardous/toxic liquids and solids
- Place books, purses, and such items in the designated storage area. Take only laboratory manuals and notebooks into the working area.
- Students are not permitted in laboratory storage rooms or teachers' workrooms without the approval of the teacher.

BIOLOGICAL SCIENCE SAFETY

ANIMALS IN THE CLASSROOM

The humane study of animals can provide important learning experiences in science and ethics. Introduction of secondary school students to animal studies in closely supervised settings can reinforce those early lessons and teach principles of humane care and use of animals in scientific inquiry. **Animals may only be housed in a classroom with principal approval. A permission slip signed by a parent or guardian must be on file for every student indicating whether or not they are allowed to handle the animal and or clean its cage.**

The following principles should govern the use of animals in the classroom or in science fair projects:

- Observational and natural history studies that do not interfere with an animal's health, well-being, or comfort are encouraged. If an intrusive study of an animal is deemed appropriate, consideration should first be given to using invertebrates with primitive nervous systems rather than invertebrates with advanced nervous systems or vertebrates. In mammalian studies, non-hazardous human experiments may be educationally preferable to those using other mammals (rats, guinea pigs, etc.). It is recommended that plants, fungi, or protozoa be used whenever possible in lieu of multi-cellular animals. Their wide variety, availability in large numbers and simplicity of maintenance and disposal make them very suitable for student work.
- Supervision should be provided by individuals who are knowledgeable and experienced with the health, husbandry, care, and handling of the animal species used. The following rules are especially important for the students:
    - Allow students to handle/touch animals only after proper directions and demonstrations have been given.
    - Have students use gloves while handling vertebrates and invertebrates.
    - Have students wash hands before and after handling animals.
    - Never allow students to tease animals or touch animals to their mouth.
    - Never allow students to clean an animal's cage without supervision.
    - Heavy rubber or leather gloves should be worn when handling live animals.
    - Students and visitors must not insert fingers into occupied cages. Warning signs should be posted conspicuously on cages housing animals that may bite.
    - Students should be trained to handle animals gently and not excite them.
    - Poisonous/venomous animals should not be brought to or kept at school.
- Appropriate care for animals must be provided daily, including weekends, holidays, etc. This care includes:
    - Nutritious food and clean, fresh water.
    - Clean housing with appropriate space and enrichment.
    - Appropriate temperature and lighting.
    - Maintaining an animal care information sheet for each classroom animal.

- **NEVER DISPOSE OF FECAL MATTER IN SINKS OR IN TRASH CANS. ALL FECAL MATTER AND ASSOCIATED MATERIALS MUST BE BAGGED SEPARATELY AND CLEARLY LABELED AS BIOHAZARD.**
- Animals should be healthy and free of disease that might be transmitted to humans or other animals. Veterinary care must be provided. **IMPORTANT: Have a veterinarian evaluate all animals that die unexpectedly.**
- **Students and teachers must immediately report to the school nurse or FASA all scratches, bites, and other injuries.**
- Animals must not be captured from or released into the wild without approval of responsible wildlife and public health officials.
- Never use poisonous/venomous animals in the classroom.
- Students should not conduct experimental procedures that may cause pain or discomfort to an animal, induce nutritional deficiencies or toxicities or otherwise interfere with an animal's normal health.
- No surgery should be performed on any living animal.
- No lesson or experiment should be performed on a vertebrate animal that employs:
    - Microorganisms that may cause disease in animals or humans
    - Ionizing radiation
    - Chemicals at toxic levels
    - Drugs that produce pain or deformity
    - Extremes of temperature
    - Stressful electric or other shock
    - Excess noise or noxious fumes
    - Exercise to exhaustion
    - Overcrowding or other distressing stimuli
- Vertebrate animal studies should be conducted only in locations where proper supervision is available–either in a school or institution of research or higher education. No such study will be assigned as homework (other than observations of normal behavior of pets such as dogs or cats).
- Behavioral conditioning studies should not involve aversive stimuli. Animals should not be deprived of clean drinking water. Food deprivation intervals should be appropriate for the species but should not continue longer than 24 hours.
- A plan for conducting an experiment with living animals must be prepared in writing and approved prior to obtaining the animals and initiating an experiment. A committee, including those who have knowledge to understand and evaluate the plan and have authority to approve or disapprove it, must review the plan. A competent science teacher must directly supervise and approve student work. The teacher should oversee all experimental procedures and be responsible for their non-hazardous nature and should personally and continually inspect experimental animals during the course of study.

For further information contact the Institute of Laboratory Animal Research (ILAR) at (202) 334-2590 or navigate at http://dels.nas.edu/ilar_n/ilarhome/index.shtml

ANIMAL CARE INFORMATION

ANIMAL SPECIES _____
COMMON NAME _____

Information Indicating Healthy Animals

Body Temperature: _____
Body Weight(s): _____
Gender: M_____F_____
Age: _____
Life Span: _____
Sexual Maturity: _____
Recommended Ambient Temperature: _____ ^{o}C _____ ^{o}F
Relative Humidity: _____
Photo Period (light/dark): _____
Water Consumption: _____
Feeding:
_____
_____
_____
_____

Housing Requirements

Space:
_____
_____

Cage/Enclosure:
_____
_____

Bedding:
_____
_____

Waste Disposal:
_____
_____

Weekend/Holiday Care Arrangements:
_____
_____

Other Requirements/Information:
_____
_____

ANIMALS IN THE CLASSROOM
SAMPLE PERMISSION SLIP

School _____
Teacher _____ **Room Number** _____
Subject _____
Date _____

Studying living organisms in a life science classroom is a "natural" way to engage to students and nurture their interest, while providing meaningful experiences to enhance the study of life processes and the behavior of organisms. Keeping live animals in the classroom requires thoughtful consideration of learning goals, school district policies, and potential dangers.

Your student has received specific instructions regarding the following animal(s):
Animal 1 _____
Animal 2 _____
Animal 3 _____
Animal 4 _____
Animal 5 _____

The student must follow all rules regarding the treatment of animals in the classroom including:

- Follow all instructions given by the teacher.
- Conduct himself or herself in a responsible manner at all times in the classroom.
- Handle or touch animals only after proper directions and demonstrations have been given.
- Wash hands before and after handling animals.
- Never tease animals or touch animals to his or her mouth.
- Never clean an animal's cage without supervision.
- Do not insert fingers into occupied cages.
- Handle animals gently and do not excite them.

Parent's or Guardian's Statement

_____ I have read the section above and **give consent** for my son/daughter to participate in the holding and or upkeep of animals in the classroom.

_____ I have read the section and **do not give consent** for my son/daughter to participate in the holding and or upkeep of animals in the classroom.

Parent Signature _____

Please list below any special allergies or sensitivities that may affect your student's safety. Also list any concerns you may have.

_____
_____

BACTERIA OR FUNGI

Although pathogenic bacteria should not be cultured, all bacteria and fungi should be handled as though they were pathogenic. Pure cultures of nonpathogenic microorganisms should be used in experiments. When water or soil is used as a source, it should be collected from areas unlikely to be contaminated by human pathogens and free of sewage and animal waste.

If agar plates are inoculated with soil or plant material or exposed to air, there is a strong possibility that some disease-causing molds, fungi, and bacteria (Histoplasmosis, Coccidiodes (Valley Fever), or Anthrax bacteria, etc.) will grow in nutrient agar. People with weakened immune systems are at a high risk for infections from inhaled fungal spores. Therefore, culture plates should not be inoculated with soil unless the plates remain sealed and are sterilized before disposal. Soil contaminated with bird or bat droppings, from archaeological sites, land around old buildings, and animal burrows should be avoided.

Collecting wild mushrooms is not encouraged. You may purchase these items from a store if available. Many parts of wild mushrooms and toadstools may contain poison.

Wire loops used for transferring bacterial cultures should be flamed until the entire wire is red-hot before and after each transfer. Loops must be allowed to cool before insertion into liquid cultures to avoid aerosol generation of the bacteria.
To sterilize plates before cleaning or disposal, follow these steps:

Using an autoclave:

- Autoclave the unopened plates. Steaming under pressure of 15 pounds per square inch for 15-20 minutes kills the majority of microbes.
- If you are trying to sterilize large volumes of soil samples, continue as follows:
    - Wait one day for resistant spores to begin growing
    - Sterilize a second time
    - Wait one day
    - Sterilize a third time

Alternate method:

- Prepare a 10% bleach solution (dilute 1 part household bleach with 9 parts water). Pour bleach solution into each Petri dish to cover the agar for 24 hours. This method may also be used to sterilize pipettes, forceps, or other contaminated materials.

These precautions are intended for laboratory activities involving any bacteria or fungi, including pathogenic strains. However, even normally nonpathogenic microorganisms can cause disease if they enter the body accidentally, especially if the immune system is suppressed. The practice of maximum precautions may provide valuable experience for students who may encounter pathogenic organisms later in their academic or professional careers.

BLOODBORNE PATHOGENS

Bloodborne pathogens are bacteria, viruses and parasites found in human blood and other body fluids. They can infect and cause disease in humans. The two pathogens recently receiving the greatest attention are the Hepatitis B virus (HBV) and Human Immunodeficiency Virus (HIV). Other pathogens that can also be of concern cause herpes, meningitis, tuberculosis, Epstein-Barr syndrome, Lyme disease, malaria and syphilis, to name a few.

Allowing students to do blood work <u>is not allowed in CCSD</u>, given the risks involved. Students involved in blood work create an unsafe working environment. Bloodborne pathogens don't discriminate!

SCIENCE TEACHERS MUST SECURE A SAFE ALTERNATIVE TO LABORATORY ACTIVITIES THAT INVOLVE HUMAN BLOOD FOR BLOOD TYPING AND URINALYSIS. THE USE OF HUMAN BLOOD OR BLOOD PRODUCTS IS PROHIBITED!

CHLORPHYLL & PIGMENT EXTRACTION

An immersion-type electric heater or water bath heated by an electric hot plate should be used, not an open-flame heated water bath. Flames should be kept away from solvents or vapors. If a solvent ignites in a beaker, cover the beaker with a glass plate. If the burning solvent spills on a table, use either a carbon dioxide fire extinguisher or fire blanket.

DISSECTION

Use of preserved animal specimen for instruction should be carefully planned to provide learning that cannot otherwise be achieved. Students should do such activities, particularly those involving the use of vertebrates, when they are prepared and have the maturity to appreciate the significance of the instructional activity.

Students should be instructed in safe use of dissection instruments as well as safety during cleaning these instruments. Adequate ventilation should be provided whenever preservative fumes are present. **Safety goggles and gloves must be worn during dissection**.

Students have the right to refrain from participating in dissection activities. A note from his or her parent or guardian should substantiate a student's objection. The teacher should then provide an alternative educational project of comparable time and effort or excuse the student from the dissection activity. Alternative assignments must be well planned and not punitive. See CCSD Regulation 6144 for details.

All preserved specimens and remaining fluid must be disposed of properly. Call 799-0990 to have a blue dissection disposal container delivered to your school. No scalpels, paper towels or other foreign matter may be placed in the container. When the container is full, call for pick-up and a replacement container if needed.

CLARK COUNTY SCHOOL DISTRICT REGULATION

6144

EXEMPTIONS FROM COURSE REQUIREMENTS

I. The State Department regulations specify that students may be excused from physical education for the following reasons:

   A. Non-enrollment for physical reasons as certified by physician's statement.

   B. Non-enrollment for religious reasons as certified by written statement.

   C. Those students enrolled in R.O.T.C. are granted exemption.

II. The State Department regulations specify that students may be excused from health education if a statement relative to religious reasons is presented.

III. Those students presenting parental statements relative to excusing students from specific units of instruction on the human reproductive system, related communicable diseases, and sexual responsibilities in any class may be excused.

IV. Those students who present a signed parental statement requesting that the student be excused from the dissection of preserved specimens shall be excused and assigned an alternative activity.

Legal Reference:	NRS Chapter 389 Courses of Study, Section 065 AGO dated September 22, 1955
Cross Reference:	Regulation 6121
Review Responsibility:	Instruction Unit
Adopted:	[6156; 7/12/63]
Revised:	(8/13/81; 8/16/82)
Pol Gov Rev:	6/28/01
Revised:	(4/11/02)

EPITHELIAL TISSUE STUDY

Great care must be used in obtaining epithelial cells from inside the cheek for study under the microscope. Use only a cotton-tipped swab or the blunt edge of a toothpick. Never use pointed instruments for this purpose. Only student volunteers who bring a signed parental permission note may conduct this experiment.

INSECT KILLING JARS

Students should be familiar with the best ways to collect and preserve insects for projects or study in the classroom. Two methods may be used. A safe killing jar can be made using a clean large jar with a screw type lid. Place a facial tissue in the bottom to absorb the killing liquid - ethyl alcohol - **(not carbon tetrachloride or potassium cyanide)**. Add the killing liquid to the bottom of the jar – usually about six drops – then place a clean tissue on top of the tissue containing the killing liquid. The jar must be labeled as follows:

INSECT KILLING JAR
DANGER: FLAMMABLE LIQUID!

To recharge the jar, remove the top tissue and add a few more drops of ethyl alcohol. Add a clean tissue on top.
An alternate method uses Plaster of Paris:
Place 1 inch of fresh Plaster of Paris in the bottom of a glass jar. Let the Plaster of Paris harden for 24 hours. At least 12 hours before using, pour in enough ethyl alcohol to cover the plaster. Let stand 20 minutes and pour off excess. Enough ethyl alcohol will be absorbed to last a week if jar is kept covered. Cover Plaster of Paris with a tissue during use. Label the jar with information noted above.

MICROSCOPES AND HAND LENSES

Students with eye infections must not use school microscopes or hand lenses. Between classes, eyepieces must be cleaned with an alcohol based lens cleaner.

OWL PELLETS

The Hanta virus is spread by rodents and is found around and in primitive, abandoned, or seasonally used buildings in Nevada and other southwestern states. The virus is often inhaled with dust in which saliva, urine, or feces from rodents have intermingled. Special decontamination measures should be taken when students come into contact with owl pellets because of the possible consumption by the owls of infected rodents. Purchase owl pellets from a reputable dealer who will certify they have been decontaminated. Do not collect them on your own.

Bottles

- Give proper instructions and caution students on the use of polyethylene squeeze bottles and the risk of dropping bottles, especially if the bottles contain flammable liquids. In such cases, bottles should not be used near open flames.

Glass tubing: For inserting glass tubing into a rubber stopper or tubing, observe the following precautions:

- Never attempt to insert glass tubing that has a jagged edge. Fire-polish the edge, if possible. Otherwise, bevel the edge with a file or emery cloth. Re-cut the tubing if necessary.
- Always aim the glass tubing away from the palm of the hand that holds the stopper or rubber tubing.
- Use water, soap solution, glycerin, or petroleum jelly as a lubricant, and gently press the tube into the hole with a twisting motion. Wash glycerin from rubber stoppers to prevent them from becoming brittle.
- Always hold glass tubing as close as possible to the part that is entering the rubber stopper.
- Cork borers should only be used with cork stoppers. They will not cut rubber.
- Lessen the chances of injury from broken tubing by wrapping a cloth around the hand or around the tubing at the point of contact with the hand.
- Do not grasp a thistle tube by the bowl when inserting the thistle tube into a rubber stopper. Grasp only the tubing, as closely as possible to where the glass tubing enters the stopper. Use plastic thistle tubes whenever possible.

Exercise care so that any hose connections between burners and gas outlets are protected from pinching or from being pulled away from the outlet.

- Never use fume hoods for storage of books, supplies, or chemicals.
- Use the stationary or portable fume hood when potentially hazardous vapors or gaseous substances are used or produced in a laboratory investigation.
- Preserve dry ice for short periods of time by wrapping the ice in several layers of newspaper to insulate it and reduce the rate of sublimation. The use of vermiculite, Styrofoam beads, or other particulate insulating material and a styrofoam chest will further extend the preservation of dry ice. Dry ice should be handled with great care to avoid contact with the skin and eyes. Gloves or tongs should be used when handling dry ice.
- Handle glass wool and steel wool carefully to avoid getting splinters in the skin or eyes.
- Never add water to concentrated acids. To dilute acids, add the concentrated acid in small quantities to the water, stirring constantly. Use heat-resistant glassware for this procedure.
- Table tops should be protected from extreme heat by using insulation under burners or heated objects.

- Each science teacher should be prepared to act deliberately and intelligently in the event of a classroom fire.
- Approved eye-protective devices should be used by all persons performing science activities involving hazards to the eyes. This includes the use of liquids, heat, and glassware. All persons in dangerous proximity must be similarly equipped.
- Laboratory aprons and rubber or plastic gloves should be available and should be worn whenever hazards exist that could damage clothing, injure someone, or irritate skin.

CHEMICAL HEALTH HAZARDS

MANY CHEMICALS ARE PROHIBITED OR RESTRICTED; PLEASE CHECK APPENDICES F AND G BEFORE ORDERING OR USING ANY CHEMICAL IN THE CLASSROOM.

Chemical substances can enter the bloodstream, in three ways: ingestion, absorption, or inhalation. The following are examples of some classes of chemical substances and their effects on the body:

Acids: Acetic, chromic, hydrochloric, nitric, sulfuric, and carbolic (phenolic) acids cause severe burns and tissue damage.

Alcohols: These irritate mucous membranes. Methanol induces blindness through ingestion or prolonged inhalation.

Aldehydes and ketones: Inhalation, absorption, or ingestion of these substances irritates tissues and produces a narcotic effect.

Alkalies: Sodium and potassium hydroxides and ammonium hydroxide cause severe tissue burns (especially destructive to eye tissue) and bronchial spasms.

Asphyxiants: Carbon monoxide, carbon dioxide, and cyanide, and cyanogens compounds reduce the oxygen-carrying capacity of the blood, stop oxidation in tissues through destruction of enzymes, and displace atmospheric oxygen.

Carbon monoxide: Prolonged exposure renders the hemoglobin of red blood cells ineffective for the transport of oxygen. May lead to death..

Compounds of sulfur, phosphorus, nitrogen: Corrode the skin and destroy respiratory tissues.

Cyanides: Absorption, inhalation, or ingestion of cyanides produces toxic effects. Cyanide compounds should not be used in high school laboratories since they generate hydrogen cyanide when dissolved in water. Hydrogen cyanide gas is extremely toxic.

Esters: Exposure causes tissue poisoning and irritation.

Ethers: Inhalation produces a powerful narcotic effect.

Halogens: Corrosive and highly irritating to tissues.

Hydrocarbons: Inhalation causes irritation and tissue destruction. *Prolonged exposure is very dangerous*. Chlorinated varieties form toxic phosgene gas when burned.

Irritants: Ammonia, phosphoric halides, hydrogen chloride, chlorine, bromine, and hydrogen sulfide damage respiratory tissues and skin.

Metal fumes: The fumes of mercury and zinc poison tissues, cause nausea and fever, even death. *Always use a fume hood.*

ESTABLISHING SAFE CHEMICAL STORAGE AREAS IN SCIENCE

Each school site must:

- Designate an administrator and a member of the science department to review, update, and ensure compliance with the CCSD's adopted procedures for laboratory safety.
- Examine all science chemical storage areas carefully for safety on a regular basis (at a minimum of once a month).
- Dispose of chemicals whose shelf-life has been exceeded, and chemicals no longer being used by completing the Environmental Services, Hazardous Material Chemical/ Waste Collection form and faxing to Environmental Services at 799-0994 (see Appendix A).
- Complete an annual inventory of all hazardous materials according to procedures of the CCSD Hazard Communication Plan.
- Ensure that alphabetized copies of Material Safety Data Sheets(MSDS) for every chemical are kept in a binder in the science prep area and an additional binder be kept in the designated administrator's office. MSDS sheets will have specific labeling that gives the name, hazard, and first aid procedures in case of exposure.

The result of planning and implementation should be a chemical storage area that has the following characteristics:

- The area is clean and orderly.
- A telephone is readily available.
- Emergency procedures are up-to-date and posted.
- A fully-stocked first-aid kit is available.
- Safety equipment and supplies (goggles, aprons, face shields, a fire blanket, fire extinguisher, eyewash, spill kit, and fume hood) are available **and functional**.
- There are no chemicals on the prohibited list present.
- Only necessary chemicals are available for use.
- Chemicals on hand will be consumed within the next year (except for items with unlimited shelf-life, such as iron filings).
- Chemicals are arranged for storage in compatible groups.
- Chemicals are properly labeled and stored in appropriate containers. Adequate spacing between containers ensures proper air circulation and safe retrieval of chemicals.
- There is a continuous up-to-date inventory of all chemicals, including quantity, location, and date of purchase, shelf-life, and projected disposal date.
- No chemicals or specimen pails are stored on the floor.
- Shelves or cabinets are secured firmly to the walls (except acid or locked metal flammable cabinets).
- No student is permitted in the storage area unless accompanied and supervised by the teacher.
- Spill lips/barriers are in place on storage shelves.
- The storeroom door is self-closing and locks automatically.
- There is adequate ventilation and air is isolated from the rest of the building.
- Compressed gas cylinders are upright and secured with a metal chain to the wall, with caps in place. Flammable gases are separated from oxidizing gases.
- There are one or more non-reactive waste receptacles made of plastic or crockery.

For any questions or concerns about the chemical storage area, the teacher should refer to the Clark County School District Chemical Hygiene Plan attached in Appendix J.

POTENTIALLY HAZARDOUS CHEMICALS

Prohibited chemicals pose an inherent, immediate and potentially life threatening risk, injury or impairment due to toxicity or other chemical properties to the students, staff or other occupants of the school. These chemicals are prohibited from use and/or storage at the school and the school is prohibited from purchasing or accepting donations of such chemicals.

Restricted chemicals are restricted by use, and/or quantities. If restricted chemicals are present at the school, each chemical is addressed in the school's written emergency plan. The majority of restricted chemicals need a fume hood and should only be used at high schools.

Prohibited chemicals cannot be ordered under any circumstance. Restricted chemicals must have a written rationale, including the purpose of usage (name of teacher, course taught, and the demonstration to be conducted). See the form on page 32. The department coordinator must meet with the site administrator for approval with verifying signature. These forms must be kept on file with the MSDS binders.

Appendices F and G contain lists of Prohibited Chemicals and Restricted Chemicals. In addition, science teachers are advised to make careful decisions about the acquisition and use of laboratory chemicals. If an especially hazardous chemical is deemed essential to a program, the responsibility to ensure safe storage and use must be assumed the designated site administrator and a member of the science department. When in doubt, school staff should contact appropriate District staff (see Appendix A for Technical Safety Assistance Contact Information).

WASTE COLLECTION

Minimize chemical waste by limiting the quantity of material purchased and used. Segregate and prepare chemical waste for collection in accordance with the procedures outlined by the CCSD Environmental Services Department. This includes depositing all waste in designated containers, labeling containers by identifying the type of hazardous waste material, and notifying Hazardous Materials whenever waste chemicals need to be removed. (See Appendix A for Technical Safety Assistance Contact Information and Appendix E for the SNHD flowcharts for chemical waste collection and disposal).

PHYSICAL SCIENCE SAFETY

INTRODUCTION

In addition to the safety practices contained in this section, teachers should be familiar with all other sections of the handbook pertinent to their instructional program. The diversity and age of the equipment used presents unique situations by which the teacher must determine whether the equipment, facility, and students can safely complete each laboratory experiment or demonstration.

Safety is a learned behavior that must be incorporated into instructional plans. The physics teacher should be cognizant of potential hazards by conducting all experiments and demonstrations prior to classroom implementation. Dangerous situations may occur quickly, and teachers need to possess knowledge and preparedness in order to practice safety with confidence and control.

As mentioned in the General Laboratory Safety section for all science disciplines, the teacher should assess the laboratory and classroom environment for safety and submit the appropriate documentation to the site administrator stating all concerns. There are several safety aids commercially available through science suppliers. These aids include posters, safety contracts, safety tests, safety citations, texts, and handbooks on secondary science safety and a variety of safety equipment. In addition to observing policies and regulations of the Clark County School District, the teacher must follow the procedures of the individual school.

The considerations in this section are not intended to be all inclusive. Specific experiments and demonstrations presented in the physics curricula vary depending upon the equipment available and the expertise and confidence of the teacher.

CHEMICAL DISPOSAL PROCEDURES

All waste disposal must be coordinated through the Clark County School District Hazardous Materials Section (See Appendix A Technical Safety Assistance Contact Information).

ELECTRICITY

The use of electricity can present a serious hazard in the classroom or laboratory. Electrical devices used in the laboratory or classroom should only be those listed by the Underwriters Laboratory (UL), or equivalent, for 110-volt outlet application or those listed for use with a low voltage direct current furnished by batteries. Electrical devices should not be used or placed near any source of water or in an area subject to wetting from any source. Exercise special care in the placement and use of aquariums, particularly when using a 110- volt light

source. Teachers should caution students that any projects submitted must meet the specifications noted or they will not be accepted.

Some guidelines for safety in the use of electrical equipment are as follows:

- Use only those 110-volt devices included in the list by Underwriters Laboratory or equivalent.
- Use 6-volt or 12-volt direct current for all possible applications.
- Operate electrical devices with dry hands and in a dry location. Make certain the floor is dry. Do not stand on metal or any other conducting surface when using electrical devices.
- Ground fault circuit interrupters (GFCIs) should be on electrical outlets near sinks.
- Ensure that power equipment or devices are double-insulated or safely grounded (three-prong plug).
- Use extension cords with extreme caution and never allow them to lie across areas of foot traffic. Be certain multiple-outlet bars have fuse protection or some other circuit breaker.
- Ask the building engineer for the location of the master electrical cut-off switch.
- Use low voltage DC for studying simple circuits.
- The teacher should check all student circuits before the power is connected.
- Never touch electrical circuit components with the power on. Only insulated tools should be used to make checks.
- In wiring an electrical circuit, make the live plug-in or the switch connection the last act in assembling and the first act in disassembling the circuit. This practice is applicable to all portable electrical apparatus. All alternating current (AC) circuits above 12 volts should be shielded to avoid direct contact.
- When using an electrical current, use only one hand at a time to avoid bringing both hands in contact with live sections of the circuit.
- Batteries should be checked for leakage and stored separately from electrical appliances.
- If an electrical current is used near a metal object, the object should be permanently insulated to prevent contact. Care should be taken to ensure that live wires do not contact grounded metal objects.
- During the charging of a student-made wet storage cell, keep students away from the fine spray that develops. It is harmful when inhaled, and is an eye and skin irritant.
- Carefully handle a storage battery. In spite of its low voltage, a high current can be drawn from it on a short circuit.
- Switches should be labeled for "on" and "off" positions.
- Proper grounding of equipment should be checked by the teacher before use.
- Any equipment with frayed cords or any other visible defects should not be used.
- Installation and repair to electrical equipment should be done by a trained repairman. Check with the administrator for the appropriate procedures for getting equipment repaired.
- Plugs should always be plugged in and pulled out using the plug, not the wire.
- Use properly grounded (three-prong, one constant ground) service outlets.

- Care should be taken not to spill liquids near electrical outlets. Spills should be cleaned up immediately.
- All potentiometers should be checked by the teacher before use in circuits by students.
- If fire does occur with a live electrical apparatus, pull the plug. Then use an appropriate fire extinguisher (Class C) dry chemical - carbon dioxide.

ENERGY EXPERIMENTS

- Ring stands should be secured with a C-clamp.
- Springs should not exceed their elastic limits.
- When viewing the pointer on a fixed scale, goggles should be worn.
- Sufficient space must be allowed during activities involving collisions.

LASERS

Before using lasers in demonstrations or in research, orient all students to the potential hazards. In general, school demonstration lasers emit visible light; therefore, students and teachers face hazards typical of visible and infrared light.

Lasers are valuable in demonstrations and laboratory experiments in school. Most school lasers are relatively low-powered, with a light emission of less than a thousandth of a watt. These lasers should not be confused with the powerful lasers intended for burning, cutting, and drilling. However, science teachers should be aware of the inherent dangers in the operation of lasers.

The greatest danger in the use of lasers is the accidental penetration of the laser beam into the eye. Relatively low-powered beams may burn the retinal area, producing a blind spot. If the retinal area irradiated is the macula, its fovea (area of extremely fine vision), or the optic nerve, severe permanent visual damage may result.

The effects on the skin are those of burns. Lighter skin with little melanin pigment is affected to a lesser degree, but skin with high melanin content (overall or in spots, such as moles) may be burned severely. Conversely, lighter skin does not protect deeper-lying tissue from visible and near infrared irradiation damage as well as darker skin does. Exposure to ultraviolet irradiation may result in “sunburn,” and, possibly, skin cancer in susceptible individuals.

Even though the power of a laser may be low, the beam should be treated with caution and common sense. Many laser hazards may be avoided by implementing the following measures: **Do not allow direct viewing of the beam**. Instruct students not to look directly into the laser beam or its bright reflections, just as they should not look directly at the sun or at arc lamps. **Do not place any portion of the body in the path of the beam**. These practices become increasingly important as the power of the laser device’s output increases. Good work practices, developed early, will benefit an individual later when working with more hazardous lasers.

Know the location of the beam's path and keep it clear of extraneous objects. All optical components should be fixed in position with relation to the laser before the beam is propagated to ensure that the beam's path does not change in an uncontrolled manner. Objects with mirror-like finishes (e.g., plumbing fixtures, personal jewelry, and tools) reflect laser beams in unexpected directions. Such surfaces should be removed from the vicinity of the beam's path. Demonstration equipment, such as support rods, bench surfaces, and adjustment tools, should be painted or treated to produce a dull, non-reflective surface.

Block the beam when it is not needed. The mechanical beam stop should be opened to allow beam emission only when necessary for measurements or observations. It should always be closed when an optical element is being inserted into the beam's path or is being relocated.

Terminate laser beams. Block off the beam at a point beyond the farthest point of interest. All laser beams should be terminated in a non-reflective, light-absorbing material. For higher power lasers (>0.5 W), the material should be nonflammable.

Demonstrations should be prepared and tested by the instructor when no one else is present. All unwanted reflections should always be determined, eliminated or blocked.

Deflect the beam in a vertical plane in complex demonstrations. In normal experimental situations, the laser beam's path should be kept in a horizontal plane at a level below or above the eye level of the teacher and observers. Complex demonstrations involving reflection or refraction should be conducted with the beam's deflection angles contained in a vertical plane to reduce the possibility of directing a stray reflection into the audience. The laser display system should be contained in a box that is open on the side(s) but closed on the ends, top, and bottom. If the beam must travel a long distance, keep it close to the ground or overhead so that it does not cross walkways at eye level.

Affix expanding lenses rigidly to the laser. When the laser is used to illuminate large surfaces, such as in the viewing of holograms, beam expanding (diverging) lenses should be fixed rigidly to the laser.

The laser should be equipped with a key switch in the primary power circuit, rather than with the more commonly used toggle switch. Key switches are available from electronic supply stores for a relatively small charge. An additional switch that requires constant pressure is desirable. Although installing a key switch is desirable, a retrofit may void the manufacturer's warranty. It is advisable to have an electrical technician perform this operation.

Do not leave an operable laser accessible and unattended. The key should be removed and placed in a secure location to prevent unauthorized use of the laser and possible injurious exposures. For the same reason, when experiments or demonstrations take place in areas that might permit access to the beam by individuals not under the control of the teacher, a responsible person should be assigned to stop the beam's emission if such access to the beam appears imminent.

Reduce the optical power of the laser. The optical power used should be reduced to the minimum necessary to accomplish the objective of the experiment or demonstration. Neutral density filters or colored plastic can be used effectively to reduce radiated optical power.

Keep the area well lighted at all times. Good lighting tends to keep the pupil of the eye relatively contracted and reduces the amount of light that might impinge upon the retina accidentally when the laser system is in use.

Provide and use adequate eye-protective devices. Protecting the eyes with shatter-resistant goggles is essential when using some types of laser systems, but no one kind of goggle offers protection from all wavelengths.
Shield the pump source. Flashlamps or arc lamps are used to transmit energy into the laser material of solid-state lasers. The high-intensity light generated by these lamps should not be viewed directly. The broadband white light emitted is not completely blocked by laser-protection eyewear. Enclosure of the lamp in an opaque housing is essential.
Never permit eye exposure to either direct or reflected laser light. Target must be made of non-reflecting material. Beams should not be set at eye level. Students should not move about the room during the activity. Prisms should be set up before class to avoid unexpected reflections.
An adequate laser for high school use is the .5 milliwatt Helium-Neon laser.

LIGHT

- Sharp mirrors should be taped. Jagged-edged and chipped mirrors should be discarded.
- The use of lenses and prisms in direct sunlight should be supervised.
- Caution should be exercised in the use of ultraviolet light sources, such as mercury-quartz lamps or carbon arc lamps that can cause severe sunburn or damage to the retina. Proper instructions, labels, and protective gear should be provided.
- Wave motion, when studied with light, generally includes the use of large coil springs or rubber hoses. Do not exceed the elastic limit of the coils or release the hose unexpectedly.
- Ripple tanks should be set up to assure the stability of the high intensity light, motor, and electrical source.
- When simulating Young's experiment, caution should be taken when handling the delicate slides and single-edged razor blades.
- The spectrum tube power supply should be checked prior to classroom use. Students should make sure that the power supply is unplugged when inserting spectrum tubes.
- Teachers should be aware that some students may have physiological or psychological reactions to the effects of a strobe light (e.g. epilepsy).

MODEL ROCKET LAUNCHINGS ON SCHOOL SITES

When using model rockets, the safety code of the National Association of Rocketry (http://www.nar.org/index.html) should be followed. Only factory prepared, solid engine propellant should be used and only as recommended by manufacturers. Direct supervision is needed.

- All rocket launchings must be approved by the site administrator.
- Only authorized classes or clubs should engage in this kind of activity on school sites and only with permission from the site administration.

- All rocketry equipment should be stored in appropriate and locked flammable cabinets. They cannot be stored with incompatible chemicals.
- The length of the rocket must not measure fewer than 10 inches (25 cm).
- The rocket must not weigh more than 1500 grams (53 ounces).
- Only commercially-produced class D or smaller engines are to be used.
- The minimum size of the launch site for class D engines should extend to a radius of 250 feet from the firing position. Details for each engine size can be found at www.nar.org.
- No fire hazard may be posed by the launch. No dry vegetation or forest areas may be within the launch radius.
- No buildings, other structures, roads, or high-voltage electrical lines may be within the launch radius. The firing area should be at the center of the launch radius.
- No rockets should be launched if the wind is blowing more than 15 miles per hour.
- Students must not attempt to recover their rockets from power lines, trees, roofs, or other dangerous places.
- Teachers should caution their students about the danger of experimenting with rockets and missiles.

MOTION AND FORCES

- Teachers should make sure that stationary devices are secured with a clamp.
- Spring-loaded carts and heavy masses should be used only as directed.
- Centripetal force labs should be conducted only with protective goggles.
- If glass rods are used, they should be fire polished and wrapped in tape. Additional space may be needed to assure the spinning mass does not hit anything. Instructions should caution students never to walk into the path of the spinning masses. The teacher should check to make sure the mass being used by each group is securely fastened.
- The building and testing of **model bridges** warrants some precautionary measures. Protective goggles should be worn by everyone when breaking bridges. Caution students about the potential hazards of the container of masses.
- Never view **solar eclipses** directly; always use an indirect method.
- Observe caution in the use of all **rotating apparatus**, such as the whirling table or Savart's Wheel. Be certain the safety nut is securely fastened at all times. The apparatus should revolve at moderate speeds only.

NATURAL GAS AND HEATING METHODS

- **The use of mercury thermometers is prohibited!**
- Locate master gas valve cut-off and leave master control "off" when valve is not in use.
- Closed containers should never be heated.
- Use proper technique to insert a thermometer into a rubber stopper to prevent lacerations.

- Bunsen burners and rubber hoses should be periodically checked for leaks.
- Fire retardant pads and gloves should be used when handling hot materials.
- Only Pyrex or heat-resistant glassware should be used when heating liquids.
- Do not leave gas jets open.
- A fire blanket and an appropriate fire extinguisher should be available in the vicinity.
- Never leave a heating object unattended.

PRESSURE

When using a **bell jar and vacuum pump** to show the effects of reduced air pressure on materials, examine the equipment before use. If any cracks or chips are found in the bell jar the items cannot be used and must be disposed of properly. **The use of a safety shield and protective eyewear is required for teachers and students.**

When using a **pressure cooker** to demonstrate the variation of boiling points under pressure, be sure to examine the safety valve on the cooker before use to make sure it is in working order. Do not exceed 20 pounds per square inch (137.8 kPa).

RADIOACTIVE MATERIALS

The details in this section are intended for the use of radioactive materials for class demonstrations only with the use of a Geiger counter or cloud chamber. Needles or button type radioactive sources are the only items that can be used in the school setting. No other use of radioactive materials is allowed at the school site. The use of radioactive isotopes in Nevada is regulated by the U.S. Nuclear Regulatory Commission and by laws and regulations of the State of Nevada. Science teachers in secondary schools who intend to use radioactive materials must become familiar with Nevada State regulations. It is of utmost importance that exposure of students, teacher, or other school personnel to any radioactive substance be minimized.

All orders for radioactive materials must be approved before purchase by the Clark County School District Hazardous Environmental Services Department (see Appendix A for contact information).
Upon receipt of radioactive materials, the teacher should:

- Inspect the package carefully for any breakage.
- Monitor the packing materials for any possible radioactive contamination. If evidence of any contamination exists, the appropriate district staff member or other appropriate agency must be notified immediately.

Each container must be labeled with the following information:

- That the package contains a radioactive substance.
- The chemical name of the material and its mass number.
- The date received and the name of the person responsible.
- The quantity of radioactive material (in Microcuries) and the latest date of measurement.

SOUND

When studying resonance, the vibrating **tuning forks** must not touch the top of the glass tube because of the danger of shattering the tube. Placing tape on the rim of the tube will reduce chipping. In the production of sound, **levels of 110 decibels** or higher can cause hearing damage. Use caution with resonance rods (singing rods) when using for prolonged periods of time.

APPENDIX A – TECHNICAL SAFETY ASSISTANCE

RESPONSE SECTION	PHONE	TOPIC/SERVICE AREA
Career & Technical Education	799-8462	Shop Safety (Auto, Mechanic, Wood, etc.)
Equipment Repair	855-6681	Fire Extinguisher
Facilities Division	799-8710	Emergency Management
Facilities and Safety Inspection	799-5030	Equipment Safety
		Inspections, Playgrounds and Schools
Grounds	799-8310	Bee Swarms/Hives on School Grounds
Environmental Services, Hazardous Materials	799-0990	Chemical Spills
		Chemical Disposal
		EPA, Federal and State
		Inspections, EPA
		Material Safety Data Sheet (MSDS)
Health Services	799-7443	Student Health
	799-0767	Bloodborne Pathogens
Inspection Services	799-7605	Fire Code Compliance
		Fire Prevention
		Inspection, Fire
		Inspection, Building
K-12 Science, Health and Foreign Language	799-2348	K-12 Science Safety Manual
Risk Management	799-2967	Accidents, General
		Accidents, Vehicle
		Injuries, Employees and Students
		Insurance, Liability
		Workers Compensation
Environmental Services	799-0985	Asbestos Management
		Indoor Air Quality
		Materials Analysis
		Shelter-in-Place
		Accidents, General
		Hazard Analysis, Safety
		Inspections, OSHA
		Occupational Safety
		Safety Equipment
		Safety Complaints
		Safety Training
		Videos, Safety
School Police	799-5411	Security – School

APPENDIX B – SAFETY SURVEY

School: _____Teacher:_____ Room Number: _____

Individual Classroom Safety Items
Circle (F) functional, (NF) nonfunctional or (NP) for not present.

Eye wash station
-Portable
F NF NP
-Permanent (plumbed)
F NF NP

Shower
-Drain located below shower
F NF NP
-Monthly schedule for flushing and testing of eyewash and showers.
F NF NP

Goggle Station/Sterilizer
1 pair of chemical splash proof goggles per student in class
F NF NP

Fume Hood (in rooms where chemistry is taught)
F NF NP

Hot Hands (used to pick up hot objects)
F NF NP

Lab Aprons
F NF NP

Acid resistant gloves
F NF NP

Glass only can
F NF NP
-Dust pan and broom for sharp objects
F NF NP

First Aid supplies
-Band –Aids
-Access to ice (for burns)
-Plastic bags (for ice)
-Rubber gloves (Universal Precaution)
-4 x 4 gauze
-Disinfectant/antiseptic

Fire extinguisher
F NF NP

Fire blanket
F NF NP

Master Cut off Valves for Gas and electricity located and identified in the room.
F NF NP

Sinks
-Student stations
-Teacher demonstration station
-Portable
F NF NP

Chemical resistant lab tables
F NF NP
-Chemical resistant lab counters
F NF NP
-CCSD Accident Report Forms
F NF NP
-Student safety contract
F NF NP

Department Level Safety Items Please mark all of the items that are located in your department prep/common area.

Chemical storage cabinets
-Acid/base/corrosion resistant
-Flammable
-Locked Storage Room

Shelves or Cabinets bolted to framing/Structural Support

Locked Chemical Storage area (Restricted Student Access)

Ventilation of chemical storage area.
F NF NP

Safety Shield (Polycarbonate shield)
F NF NP

Explosion Proof Refrigerator
F NF NP

Spill Control Station (2 per department)
F NF NP

Autoclave
F NF NP

Step Ladder or Step Stools
F NF NP

Emergency Lighting
F NF NP

MSDS Files (Science Department copy, Main Office or Library copy)
F NF NP

APPENDIX C – LAB INSPECTION CHECKLIST

School Name: _____
Conducted By: _____
Date of Inspection:_____
Room Number: _____

I. Laboratory Work Practices

	Yes/No	Comments
✓ No smoking, food & beverages rules are observed. ✓ Food and beverages are not stored in the laboratory areas, refrigerators or in glassware that is also used for laboratory operations.	Yes/No	
✓ Pipetting is performed by mechanical means.	Yes/No	
✓ Laboratory surfaces are cleaned; disinfected or decontaminated after work is performed.	Yes/No	
✓ Required personal protection equipment is being worn.	Yes/No	
✓ Used needles are stored in appropriate sharps containers.		
✓ Syringes are needle locking.	Yes/No	
✓ No recapping of needles is performed.	Yes/No	
✓ Hoods are not being used for storage.	Yes/No	

II. Housekeeping

	Yes/No	Comments
✓ Laboratory and storage areas uncluttered and orderly (including bench tops).	Yes/No	
✓ Aisles & exits are free from obstruction.	Yes/No	
✓ Work surfaces are protected from contamination.	Yes/No	
✓ Electrical cords are in good condition and are UL listed.	Yes/No	
✓ Tools and equipment are in good repair and electrically grounded.	Yes/No	
✓ Tops of cabinets and shelves are free from stored items.	Yes/No	
✓ Heavy objects are confined to lower shelves.	Yes/No	
✓ Glassware is free from cracks, chips, sharp edges and other defects.	Yes/No	
✓ Broken glass containers are available and in use.	Yes/No	

III. Personal Protective Equipment

	Yes/No	Comments
✓ Protective gloves are available and matched to hazards involved.	Yes/No	
✓ Eye protection is available and in use in all laboratories.	Yes/No	
✓ Lab coats or other protective garments are available and in use.	Yes/No	
✓ Lab coats are only worn in the laboratory and are removed before entering offices, lunchrooms, rest rooms, conference rooms and other non-laboratory general use areas. (This includes disposable protective clothing).	Yes/No	
✓ Dirty lab coats/uniforms are stored in a covered container until removed for laundering.	Yes/No	
✓ Appropriate protective clothing is available and in use when working with radioactive materials.	Yes/No	

IV. Hazard Communication

	Yes/No	Comments
✓ Primary & secondary chemical containers are labeled with identity, appropriate hazard warnings, and expiration dates.	Yes/No	
✓ Signs on storage areas (e.g. refrigerators) and laboratories are consistent with hazards within.	Yes/No	
✓ MSDS binders are available for chemicals used and stored in area.	Yes/No	
✓ Employees know the location of the MSDS binders for their work area.	Yes/No	
✓ Satellite MSDS collections are complete and readily available at all times to labs.	Yes/No	

V. Chemical Storage

	Yes/No	Comments
✓ Incompatible materials are segregated.	Yes/No	
✓ Corrosives and flammables are stored below eye level.	Yes/No	
✓ Hazardous materials used/stored in the laboratory are limited to small quantities.	Yes/No	
✓ Unnecessary, unused, or outdated materials are removed from laboratories and chemical storage areas.	Yes/No	
✓ Safety carriers are available and in use while transporting chemicals.	Yes/No	
✓ All lab carts have side-rails.	Yes/No	
✓ All containers are properly labeled.	Yes/No	

VI. Flammable Liquids Storage & Handling

	Yes/No	Comments
✓ Flammable liquids are stored and used away from ignition sources.	Yes/No	
✓ Bulk quantities of flammable liquids are stored in approved storage cabinets.	Yes/No	
✓ Flammable liquid storage cabinets are properly labeled.	Yes/No	
✓ Flammable liquid storage cabinets close properly.	Yes/No	
✓ Flammables stored on open shelves in glass or plastic containers are within permissible quantities.	Yes/No	
✓ Safety cans used to handle small quantities of flammable liquids are properly labeled.	Yes/No	
✓ Solvent waste cans are labeled properly.	Yes/No	
✓ Nothing is stored on top of flammable cabinets.	Yes/No	

VII. Compressed Gas Cylinders

	Yes/No	Comments
✓ Gas cylinders are properly chained/secured.	Yes/No	
✓ Cylinder caps are in place when cylinders are not in use or being moved.	Yes/No	
✓ Gas cylinders are transported on a cart with chains.	Yes/No	
✓ Gas cylinders are stored away from excessive heat.	Yes/No	
✓ Fuel gas cylinders are at least 20 feet away from oxygen cylinders.	Yes/No	
✓ Gas cylinders are properly marked as to their contents.	Yes/No	
✓ Full and empty cylinders are stored separately.	Yes/No	
✓ Empty gas cylinders are labeled “EMPTY”.	Yes/No	
✓ Gas lines, piping, manifold, etc. are labeled with the identity of their contents.	Yes/No	
✓ Hoses, tubing and regulators are in good working condition.	Yes/No	

VIII. Waste Handling: Hazardous, Non-Hazardous & Biological

	Yes/No	Comments
✓ No liquid waste is disposed of in the sinks or the sewer.	Yes/No	
✓ Hazardous wastes are not accumulated for longer than one month in the laboratory.	Yes/No	
✓ Waste streams are separated as necessary: ex. Solid vs. liquid, hazardous vs. non-hazardous, halogenated vs. non-halogenated, etc.	Yes/No	
✓ Waste containers are appropriately tagged before placing in waste room.	Yes/No	
✓ Containers of hazardous waste are labeled properly with the date and name of person discarding waste.	Yes/No	
✓ **Biological waste** is appropriately marked with a biohazard symbol.	Yes/No	
✓ Syringes and other sharp waste are disposed of into a sharps container and placed directly into biohazard waste container.	Yes/No	
✓ Waste material is not allowed to accumulate on the floors, in corners or under shelves/tables in laboratories.	Yes/No	
✓ **Radioactive waste** is properly marked with radiation symbol.	Yes/No	

IX. Means of Egress and Emergency Exits

	Yes/No	Comments
✓ Exits are clearly marked.	Yes/No	
✓ Exits are free from obstruction.	Yes/No	
✓ All fire doors are self-closing.	Yes/No	
✓ All fire doors are kept closed.	Yes/No	
✓ Fire alarms are provided.	Yes/No	
✓ Telephones are labeled with emergency numbers.	Yes/No	
✓ Emergency evacuation routes are clearly posted.	Yes/No	
✓ Emergency evacuation routes are posted in common hallways.	Yes/No	
✓ Emergency exit lights are working and clear of obstruction.	Yes/No	

X. Safety Equipment

	Yes/No	Comments
✓ Safety showers and eye wash stations are located within 75' of all laboratories.	Yes/No	
✓ Safety showers and eye wash stations are clearly labeled, and these areas are clear from obstruction.	Yes/No	
✓ All showers and eye wash stations are clean, covers are replaced and they in good working condition.	Yes/No	
✓ Fire extinguishers are available.	Yes/No	
✓ Fire extinguishers are the appropriate type for the hazard in the work area.	Yes/No	
✓ Fire extinguishers are checked monthly. Date of last check: _____	Yes/No	
✓ Fire detection devices, smoke alarms, sprinkler systems, lighted exit signs are in good working condition.	Yes/No	
✓ First-aid supplies are readily available and clearly visible.	Yes/No	
✓ Spill team list is clearly posted in laboratories.	Yes/No	

XI. Other Labeling & Posting

	Yes/No	Comments
✓ Warning signs and labels are present whenever required (e.g. carcinogen, mutagen) where chemicals are stored.	Yes/No	
✓ "Caution- Radioactive Material" signs are posted on doors of all authorized laboratories, and on refrigerators/freezers where materials are stored.	Yes/No	
✓ Biohazard symbols are posted on access doors to biohazard laboratories and animal rooms and on potentially contaminated equipment.	Yes/No	

APPENDIX D – CHEMICAL STORAGE

CHEMICAL COMPATIBILITY CATEGORIES

1. All **Metals.** Flammable solids should be stored in the flammables cabinet. Keep separate from oxidizers (including ammonium nitrate), halogens, organic compounds, and moisture.
2. **Oxidizers** . All except ammonium nitrate. Includes nitrates, nitrites, permanganates, chlorates, perchlorates, peroxides, and hydrogen peroxide 30 percent or greater. Keep separate from metals, acids, organic materials, and ammonium nitrate. Preferably, isolate oxidizers from the flammable liquids storage cabinet by a minimum of eight meters (25 feet) or by a one-hour fire wall.
3. **Ammonium nitrate.** Store in isolation from all other chemicals, especially acids, powdered metals, flammable liquids, chlorates, nitrites, sulfur, and finely divided organic combustible materials.
4. **Bases.** Strong bases—sodium hydroxide, potassium hydroxide, and other regulated bases—and ammonium hydroxide. Store in a dedicated corrosive chemical storage cabinet that has an interior constructed entirely of corrosion-resistant materials.
5. **Acids.** Inorganic (except nitric acid) and regulated organic acids. Store in a dedicated corrosive chemical storage cabinet that has an interior constructed entirely of corrosion-resistant materials.
6. **Nitric acid.** Must be stored separately from acetic acid. Store either in an isolated compartment in the acids cabinet or in special Styrofoam containers available for that purpose from vendors of chemicals. Fuming nitric acid should never be used.
7. **Flammables.** Store in a dedicated flammables storage cabinet painted with heat/flame-resistant paint. Preferably, isolate flammables from all oxidizers by a minimum of eight meters (25 feet) or by a one-hour fire wall.
8. **Poisons.** Use a lockable cabinet designated for poison only.
9. **Compressed gases.** Cylinders must be chained or strapped to the wall, with caps on tight. (a) Keep oxidizing gases remote from flammable liquids, metals, and flammable gases; (b) Keep flammable gases remote from oxidizers and oxidizing gases by a distance of eight meters (25 feet) or by a one-hour fire-wall.
10. **Low-hazard chemicals.** Many of the salts not otherwise specified (*not* the nitrates), weak bases, oxides, carbonates, sulfides, dyes, indicators, stains, noncorrosive organic acids, amino acids, sugars, and so forth. Store on open shelves that have earthquake barriers.

COMMON CHEMICAL STORAGE SYSTEM

Science teachers will utilize the chemical storage system as recommended by the Southern Nevada Health District (SNHD). This system is taken from the National Institute for Occupational Safety and Health (NIOSH) document entitled *School Chemistry Laboratory Safety Guide.* This guide can be downloaded from www.cdc.gov/nisoh.

A suggested arrangement of compatible chemical families on shelves in a chemical storage room is depicted here. However, the list of chemicals below does not mean that these chemicals should be used in a school laboratory. Please refer to the **Prohibited and Restricted Chemical List** found in Appendices F and G.

In addition, middle schools or junior high schools may have a limited number of chemicals and chemical cabinets. Therefore, some chemicals can safely be stored on the same shelf as delineated in the following pages if families are separated by a piece of wood or plastic.

To begin organizing chemical cabinets sort chemicals into organic and inorganic classes. Next, separate into the following compatible familes:

Inorganics	**Organics**
1. Metals, Hydrides	1. Acids, Anhydrides, Peracids
2. Halides, Halogens, Phosphates, Sulfates, Sulfites, Thiosulfates	2. Alcohols, Amides, Amines, Glycols, Imides, Imines
3. Amides, Azides*, Nitrates* (except Ammonium Nitrate), Nitrites*, Nitric acid	3. Aldehydes, Esters, Hydrocarbons
4. Carbon, Carbonates, Hydroxides, Oxides, Silicates	4. Ethers*, Ethylene oxide, Halogenated Hydrocarbons, Ketenes, Ketones
5. Carbides, Nitrides, Phosphides, Selenides, Sulfides	5. Epoxy Compounds, Isocyanates
6. Chlorates, Chlorites, Hydrogen Peroxide*, Hypochlorites, Perchlorates*, Perchloric Acid*, Peroxides	6. Azides*, Hydroperoxides, Peroxides
7. Arsenates, Cyanates, Cyanides	7. Nitriles, Polysulfides, Sulfides, Sulfoxides
8. Borates, Chromates, Manganates, Permanganates	8. Cresols, Phenols
9. Acids (except Nitric Acid)	
10. Arsenic, Phosphorous*, Phosphorous Pentoxide*, Sulfur	

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

CHEMICAL LABELING

Chemicals located in chemical storage areas, chemical cabinets, and classrooms must utilize a consistent label format. Each chemical must include the following:

- Full Chemical Name
- Chemical Formula
- Concentration
- Quality or Grade (Reagent, Lab, etc.)
- Date Purchased
- Expiration Date
- Shelf Life
- Disposal Reference
- Hazard Information, Including NFPA Coding (National Fire Protection Association labeling system that rates the hazards of a chemical during a fire to include health, flammability, and reactivity hazard)
- Warning and First Aid Information
- Storage Location and Code (cabinet and shelf location)
- CAS Number (number assigned by the Chemical Abstract Service (CAS) to a chemical or a group of similar chemicals)

SUGGESTED SHELF STORAGE PATTERN – HIGH SCHOOL

(See the *Flinn Scientific Catalog/Reference Manual* for detailed storage information)

CABINET 1
SHELF 1: Inorganic #10 Pentoxide, Sulfur
SHELF 2: Inorganic #2 Halides, Halogens, Phosphates, Sulfates, Sulfites, Thiosulfates
SHELF 3: Inorganic #3 Amides, Azides, Nitrates, Nitrites EXCEPT Ammonium Nitrate -STORE AMMONIUM NITRATE AWAY FROM ALL OTHER SUBSTANCES
SHELF 4: Inorganic #1 Hydrides, Metals STORE AWAY FROM WATER. STORE ANY FLAMMABLE SOLIDS IN DEDICATED CABINET
SHELF 5: Inorganic #4 Carbon, Carbonates, Hydroxides, Oxides, Silicates

CABINET 2
SHELF 1: Inorganic #7 Arsenates, Cyanates, Cyanides STORE AWAY FROM WATER
SHELF 2: Inorganic #5 Carbides, Nitrides, Phosphides, Selenides, Sulfides
SHELF 3: Inorganic #8 Borates, Chromates, Manganates, Permanganates
SHELF 4: Inorganic #6 Chlorates, Chlorites, Hypochlorites,Hydrogen Peroxide, Perchlorates, Perchloric Acid, Peroxides
SHELF 5: Miscellaneous

SUGGESTED SHELF STORAGE PATTERN – HIGH SCHOOL

(See the *Flinn Scientific Catalog/Reference Manual* for detailed storage information)

CABINET 3
SHELF 1: Organic #2 Alcohols, Amides, Amines, Imides, Imines, Glycols STORE FLAMMABLES IN A DEDICATED CABINET
SHELF 2: Organic #3 Aldehydes, Esters, Hydrocarbons STORE FLAMMABLES IN A DEDICATED CABINET
SHELF 3: Organic #4 Ethers, Ethylene Oxide, Halogenated Hydrocarbons, Ketenes, Ketones STORE FLAMMABLES IN A DEDICATED CABINET
SHELF 4: Organic #5 Epoxy Compounds, Isocyanates
SHELF 5: Organic #7 Nitriles, Polysulfides, Sulfides, Sulfoxides

CABINET 4
SHELF 1: Organic #8 Cresols, Phenol
SHELF 2: Organic #6 Azides, Hydroperoxides, Peroxides
SHELF 3: Organic #1 Acids, Anhydrides, Peracids STORE CERTAIN ORGANIC ACIDS IN ACID CABINET
SHELF 4: Miscellaneous
SHELF 5: Miscellaneous

SUGGESTED SHELF STORAGE PATTERN – HIGH SCHOOL

(See the *Flinn Scientific Catalog/Reference Manual* for detailed storage information)

CABINET 5
SHELF 1: Inorganic #9 (Acids) **Acids, EXCEPT Nitric Acid –** Store Nitric Acid away from other acids unless the cabinet provides a separate compartment for Nitric Acid storage

CABINET 6
SHELF 1: Flammable Organic #2 Alcohols and Glycols
SHELF 2: Flammable Organic #3 Hydrocarbons and Esters
SHELF 3: Flammable Organic #4

CABINET 7
SHELF 1: Poison Storage

SUGGESTED SHELF STORAGE PATTERN – MIDDLE SCHOOL

(See the *Flinn Scientific Catalog/Reference Manual* for detailed storage information)
(see high school for names of compounds)

CABINET 1
SHELF 1: **Inorganic #3, #6, #7, #8**
SHELF 2: **Inorganic #2**
SHELF 3: **Inorganic #2, #10**
SHELF 4: **Inorganic #1, #5**
SHELF 5: **Inorganic #9**

CABINET 2
SHELF 1: **Inorganic #4**
SHELF 2: **Organic #9, #1**
SHELF 3: **Organic #2, #3, #4**
SHELF 4: **Organic #5, #6, #7, #8**
SHELF 5: **Organic and Inorganic** **Miscellaneous**

SUGGESTED SHELF STORAGE PATTERN – MIDDLE SCHOOL

(See the *Flinn Scientific Catalog/Reference Manual* for detailed storage information)
(see high school for names of compounds)

CABINET 3
SHELF 1: **Organic # 1** **Inorganic #9 (Acids)** **Acids, EXCEPT Nitric Acid –** Store Nitric Acid away from other acids unless the cabinet provides a separate compartment for Nitric Acid storage

CABINET 4
SHELF 1: Flammable Organic #2 Alcohols and Glycols
SHELF 2: Flammable Organic #3 Hydrocarbons and Esters
SHELF 3: Flammable Organic #4
SHELF 4: Flammable Organic #9

APPENDIX E
WASTE DISPOSAL

The flowcharts provided in this section were developed by the Southern Nevada Health District as a resource for secondary science teachers.

Concentrated Inorganic Acid and Bases can all be neutralized and put down the drain with lots of water. Bulk amounts should be handled through waste collection.

Inorganic Waste

Ammonium, Potassium or Sodium Cations: solutions or solids

- If solution or solid contains one of the following anion: H^-, F^-, NO_2^-, ClO_3^-, SCN^-, MnO_4^-, CN^-, O^{-2}, S^{-2}, SO_3^{-2}, CrO_4^{-2}, $Cr_2O_7^{-2}$, N^{-3}, P^{-3}, AsO_4^{-3}:
  - Solution or solid must be bag or bottles, labeled and saved for waste collection
- If the solution or solid contains NO_3^- or $S_2O_3^{-2}$:
  - Solids: Collect in bottle or bag, label and save for waste disposal
  - Solution less than or equal to 1.0 M may go down the drain with running water
  - Solutions greater than 1.0 M, bottle, label and save for waste collection
- If the solution or solid does NOT contain any other metal or any of the anions from the first two (pink and yellow) boxes:
  - Solutions: Down the drain with running water
  - Solids: Bag and throw away for Landfill disposal

Solids containing any metal other than Potassium or Sodium

- Bag or bottle, label and save for waste collection

Solutions containing any metal other than Potassium or Sodium

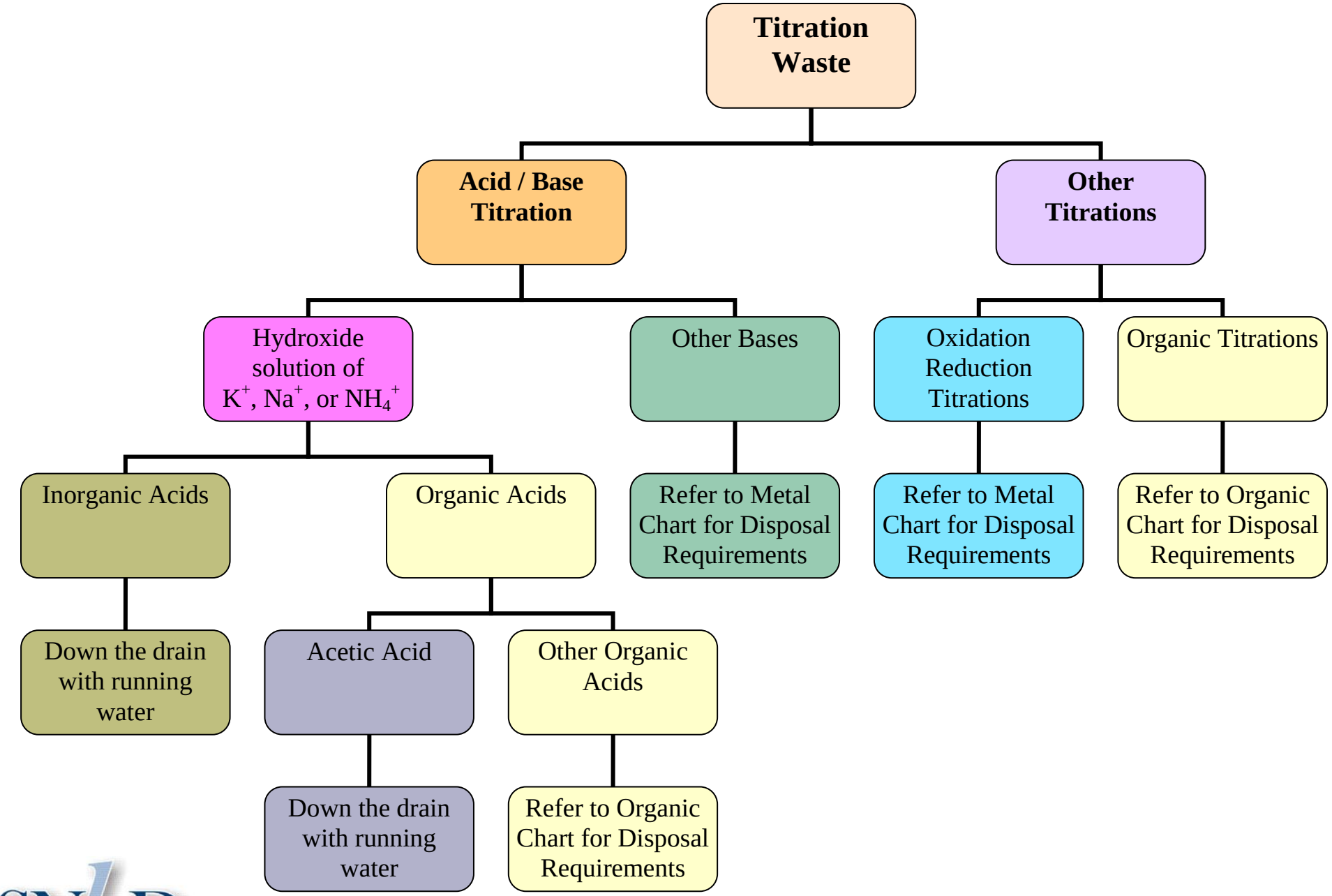
- Bottle, label and save for waste collection

Organic Waste:

All Organic Waste must be bottled, labeled and saved for disposal except the following:

Acetic Acid
Ethanol
Sucrose
Starch
Indicators used in experiments by drops can go down the drain with running water, however, bulk indicators must be collected for disposal

SNHD Southern Nevada Health District


Titration Waste
Acid / Base Titration
Other Titrations
Hydroxide solution of K^+, Na^+, or NH_4^+
Other Bases
Oxidation Reduction Titrations
Organic Titrations
Inorganic Acids
Organic Acids
Refer to Metal Chart for Disposal Requirements
Refer to Metal Chart for Disposal Requirements
Refer to Organic Chart for Disposal Requirements
Down the drain with running water
Acetic Acid
Other Organic Acids
Down the drain with running water
Refer to Organic Chart for Disposal Requirements

APPENDIX F
PROHIBITED CHEMICALS

PROHIBITED CHEMICAL LISTING	
CHEMICAL NAME	**REASON FOR PROHIBITING**
Acrylamide (and pre-poured gels)	Possible neurotoxin and carcinogen
Acrylonitrile	OSHA listed carcinogen; flammable
4-Aminodiphenyl	OSHA listed carcinogen
2-Acetylaminofluorene	OSHA listed carcinogen
Ammonium Chromate	OSHA known human carcinogen
Ammonium Dichromate	May decompose to chromium (III),known human carcinogen
Ammonium Perchlorate	Explosive
Ammonium Sulfide	Contact with acids or acid fumes may liberate flammable and poisonous hydrogen sulfide gas, strong skin and mucous irritant
Aniline; Aniline Hydrochloride	Combustible; may be fatal if inhaled, ingested, or absorbed through the skin, confirmed animal carcinogen
Anthracene	Irritant; may cause an allergic skin reaction
Antimony Trichloride	Corrosive
Arsenic and any of its compounds	Poison; known human carcinogens, highly toxic
Asbestos in any form	OSHA known human carcinogen
Ascarite II	Corrosive; may be fatal if ingested
Azides, heavy metal salts	Primary high explosive detonable when heated or shaken
Benzene	OSHA known human carcinogen; flammable
Benzidine	OSHA listed carcinogen
Benzoyl Peroxide	Flammable; can spontaneously explode
Benzaldehyde	DEA Schedule I precursor for the production of amphetamine and P2P which is used to produce methamphetamine
Benzyl Chloride	DEA Schedule I precursor for the production of methamphetamine
Bouin's Solution	25% Formaldehyde, suspected carcinogen
Cadmium	Positive animal carcinogen, teratogen and mutagen; known human carcinogen, toxic if inhaled or swallowed
Cadmium Chloride	Known human carcinogen
Cadmium Nitrate	Known human carcinogen, highly toxic, flammable

CHEMICAL NAME	REASON FOR PROHIBITING
Cadmium Oxide	Poison
Cadmium Powder	Poison
Cadmium Salts	Poison
Cadmium Sulfate	Highly toxic, positive animal carcinogen, bio-accumulative in all organisms major ingredient is picric acid
Calcium Cyanide	May be fatal if inhaled or ingested
Carbon Disulfide	Flammable; acute central nervous system toxicity
Carbon Tetrachloride	Nephrotoxin and hepatotoxin, suspect human carcinogen (OSHA says known carcinogen), absorbs through skin
Chloretone	Regulated as a drug in may state; highly addictive, toxic
Chloral Hydrate	Controlled barbiturate
Chlorine	Oxidizer; corrosive; may be fatal if inhaled
Chloroform	Suspected human carcinogen, may cause cardia-arrhythmias
bis-Chloromethyl Ether	OSHA and ACGIH listed carcinogen
Chloropromazine	Controlled substance
Chromium Trioxide	Highly toxic, corrosive and carcinogenic
Colchicine	Highly toxic, 2/100 gram potentially fatal; mutagen
Collodion	Contains 70% ethyl ether
Diazomethane	Suspected carcinogen
Dichloroacetylene	Suspected carcinogen
1.2-Dibromo-3-Chloropropane	OSHA listed larcinogen
3,3-Dichlorobenzidine	OSHA listed carcinogen
1,2 Dichloroethane (aka Ethylene Dichloride)	Peroxide former, fatalities have occurred
Dichloropropene	Suspected carcinogen, absorbs through skin
4,4-Dimethylaminoazobenzene	OSHA listed carcinogen
Dimethylamine; Dimethylaniline	Acute toxins
1,1-Dimethylhydrazine (aka UDMH)	Suspected carcinogen
2,4 Dinitrophenol	Irritant, cellular metabolic poison
Dinitrotoluene	Suspected carcinogen, absorbs through skin, highly explosive
1,4 Dioxane	Known carcinogen, may explode, high fire risk, absorbs through skin
Divinyl Acetylene	Peroxide former fatalities have occurred
Ephedrine	DEA Schedule I precursor used in the production of methamphetamine
Epinephrine	Can be fatal
Estrone	Known carcinogen
Ethidium Bromide	Mutagen

CHEMICAL NAME	REASON FOR PROHIBITING
Ethyl Acetate	Fire and explosion risk, toxic by inhalation and skin absorption
Ethylamide	DEA Schedule I precursor used in the production of methamphetamine
Ethylene Dibromide	Known carcinogen, absorbs through skin
Ethylenediamine	OSHA listed carcinogen, explosive
Ethylene Oxide	OSHA listed carcinogen
Ethyl Bromide	Suspected carcinogen, absorbs through skin, inhalation hazard
Ethyl Ether (Diethyl Ether)	Highly flammable, explosive with age
Explosives and Ammunition; Gunpowder	Explosive
Fisher-Fresh Concentrate	Contains formaldehyde, a suspected human carcinogen and known animal carcinogen
Formaldehyde	Known animal carcinogen and OSHA listed human carcinogen; poison; may cause allergen reaction
Formalin	Possible human carcinogen
Formic Acid	Explosion hazard upon aging
Glazes with Lead and Cadmium	Toxic, suspected carcinogens
Hexachlorophene	May be fatal if inhaled, ingested, or absorbed through the skin; possible teratogen
Hydrazine (anhydrous)	Flammable, acute toxin, suspected human carcinogen
Hydrobromic Acid	Corrosive; may be fatal if inhaled or ingested
Hydrocyanic Acid	Extremely Toxic
Hydrofluoric Acid	Corrosive; may be fatal if inhaled or ingested; can cause severe burns
Hydrogen	Flammable
Hydrogen Sulfide	Corrosive, as deadly as cyanide gas
Hydriodic Acid	Corrosive; may be fatal if inhaled or ingested
Isopropyl Ether	Peroxide former, fatalities have occurred
Isosafrole	DEA Schedule I precursor
Lead (II) Arsenate	High toxicity; known human carcinogen and teratogen
Lead Carbonate	May be fatal if inhaled or ingested; neurotoxin
Lindane	Suspected carcinogen, absorbs through skin
Lithium Metal	Combustible; water reactive
Magnesium Metal or Powder (RIBBON IS ALLOWED)	May ignite spontaneously on contact with water or damp materials
Mercury and all its compounds	Corrosive; may be fatal if inhaled or ingested
Mathylamine and other primary amines	DEA Schedule I precursor used in production of methamphetamine
Methylchloromethyl Ether	OSHA listed carcinogen
Methyl Ethyl Ketone	Irritant; flammable, inhalation hazard includes birth defects
Methylhydrazine (Mono or Di)	Explosive, used in rocket fuel

CHEMICAL NAME	REASON FOR PROHIBITING
Methyl Iodide	May be fatal if inhaled or ingested, or absorbed through the skin; carcinogen
Methyl Methacrylate	Flammable; explosive
Methyl Orange Solid (INDICATOR SOLUTION ARE ALLOWED)	Possible mutagen
Methyl Red Solid (INDICATOR SOLUTION ARE ALLOWED)	Possible mutagen
2-Methoxy Ethanol	Possible teratogen, absorbed through skin
Nickel Carbonyl	Known human carcinogen
Nickel Metal	Known human carcinogen; mutagen
Nickel Oxide	Known human carcinogen; mutagen
Nickel Powder	Acute toxin
Nicotine	May be fatal if inhaled or ingested, or absorbed through the skin
Fuming Nitric Acid (CONCENTRATED, NON-FUMING ACID IS ALLOWED)	Known human carcinogen; mutagen
Nitro Compounds (di or tri)	Explosion Hazard
4-Nitrobiphenyl	OSHA listed carcinogen
Nitroglycerine	Explosion hazard
1-Naphthylomine & Salts	Known human carcinogen
2-Naphthylomine & Salts	Known human carcinogen
alpha-Naphthylamine	OSHA listed carcinogen
beta-Naphthylamine	OSHA listed carcinogen
N-Nitrosodimethylamine	OSHA listed carcinogen
Organo-Peroxides including Benzoyl Peroxide	Explosion hazard
Organo-Phosphorus	Highly explosive and toxic gases
Oleum (32 Molar Sulfuric Acid, fuming Sulfuric Acid)	Extremely corrosive, causes severe burns
Osmium Tetroxide	May be fatal if inhaled or ingested
Paris Green	May be fatal if inhaled or ingested, or absorbed through the skin; known human carcinogen
Perchloric Acid	Dangerously explosive, corrosive
Phenol	Combustible; corrosive; may be fatal if inhaled or ingested, or absorbed through the skin
Phenylhydrazine	Suspected carcinogen, absorbs through skin
Phenylhydrazine Hydrochloride	Suspected carcinogen
Phosphorous (Red or White)	Extremely reactive, very toxic when burned, can cause very serious skin burns
Phosphorous Pentachloride	Reactive in water, source of hydrogen chloride and chlorine gas
Phosphorous Pentoxide	Water reactive; corrosive
Phthalic, Anhydride	Combustible; finely dispersed particles form explosive mixture in air; corrosive
Picric Acid	Extremely reactive; may be explosive

CHEMICAL NAME	REASON FOR PROHIBITING
Piperdine	DEA Schedule I precursor
Piperonal	DEA Schedule I precursor
Potassium Amide	Peroxide former, fatalities have occurred
Potassium Cyanide	Extremely poisonous
Potassium Metal	Flammable, water reactive, peroxide former, fatalities have occurred
Potassium Oxalate	Corrosive; may be fatal if ingested, fatalities have occurred
Potassium Sulfide	Spontaneously combustible; explosive in dust or powder form
Progesterone	Known human carcinogen
Propionic Anhydride	DEA Schedule I precursor
beta-Propiolactone	OSHA listed carcinogen
Pyridine	Flammable; possible mutagen
Pyrogallol	Poison, fatal dose (adult) is t grams, may be absorbed through the skin
Radioactive Materials	Carcinogenic, teratogenic
Safrole	DEA Schedule I precursor
Selenium	Sever irritant
Silver Cyanide	May be fatal if inhaled or ingested, or absorbed through the skin
Silver Oxide	Oxidizer
Sodium Amide	Peroxide former, fatalities have occurred
Sodium Arsenate	May be fatal if inhaled or ingested; known human carcinogen
Sodium Arsenite	Suspected carcinogen, acute toxin, deadly poison
Sodium Azide	Explosive when heated; May be fatal if ingested, or absorbed through the skin
Sodium Chromate	Oxidizer; corrosive; known human carcinogen
Sodium Cyanide	Poison
Sodium Dichromate	Oxidizer; corrosive; may be fatal if ingested; known human carcinogen
Sodium Nitrite	Oxidizer
Sodium Perchlorate	Explosive
Sodium Peroxide	Serious explosion, fire risk
Sodium Sulfide	Corrosive; may be fatal if inhaled or ingested
Sodium Thiocyanide	Contact with acid liberates very toxic gas
Stannic Chloride, Anhydrous	Corrosive; hydrochloric acid liberated upon contact with moisture and heat
Stearic Acid	May form combustible dust in the air
Strontium	Water reactive
Strontium Nitrate	Oxidizer
Sudan II & IV Solids (SOLUTIONS ARE ALLOWED)	Irritant; toxic properties have not been thoroughly evaluated
(Fuming) Sulfuric Acid (CONCENTRATED, NON-FUMING ACID IS ALLOWED)	Corrosive; may be fatal if ingested
Tannic Acid	Irritant

CHEMICAL NAME	REASON FOR PROHIBITING
alpha-Terpineol	Tumorigenic effects in animals
Tetrabromoethane	May be fatal if inhaled or ingested, or absorbed through the skin
Testosterone; Testosterone Propionate	Positive animal carcinogen, suspect human carcinogen, may affect reproductive system
Tetrahydrofuran	Explosive if improperly stored
Thioacetimide	Reasonably anticipated human carcinogen
Thiourea	Reasonably anticipated human carcinogen
2,4,6-Trinitrotoluene	Explosive, possible carcinogen
Titanium Trichloride	Water reactive; corrosive
Titanium Tetrachloride	Water reactive; corrosive; may be fatal if inhaled
o-Tolidine	Suspected carcinogen, absorbs through skin
o-Toluidine	Reasonably anticipated human carcinogen; mutagen
o-Toluidine Blue	Suspected carcinogen, absorbs through skin
p-Toluidine	Suspected carcinogen, absorbs through skin
2,4,6 - trinitrotoluene	Explosive, possible carcinogen
Trichlororacetic Acid	Animal mutagen
1,1,1-Trichloroethane	Reproductive and mutagenic effects in animals
1,1,2-Trichloroethane	Suspected carcinogen, absorbs through skin
Trichloroethylene	Positive animal carcinogen, suspected human carcinogen
Urathane	Combustible; reasonably anticipated human carcinogen
Uranium	Radioactive
Uranyl Acetate	Radioactive
Uranyl Nitrate	Radioactive
Vinyl Bromide	Suspected carcinogen
Vinyl Chloride	OSHA listed carcinogen
Wood's Metal	May be fatal if inhaled or ingested; known human carcinogen
Zinc Chromates	Known human carcinogen (ACGIH)

APPENDIX G
RESTRICTED CHEMICALS

RESTRICTED CHEMICAL LISTING	
CHEMICAL NAME	**REASON FOR RESTRICTION**
Acetaldehyde	Suspected carcinogen, highly flammable
Acetamide	Suspected animal carcinogen
Acrylamide	Suspected carcinogen, absorbs through skin
AITCH-TU-ESS Cartridges (HIGH SCHOOL ONLY)	Generates explosive and toxic gas
Aldrin	Suspected carcinogen, absorbs through skin
Allyl Chloride	Suspected carcinogen
Aluminum Chloride, Anhydrous (Hydrate Salts Are Allowed)	Water reactive; corrosive
Ammonium Bichromate	Oxidizer, corrosive, known human carcinogen
Ammonium Nitrate	Explosive if heated under confinement
Ammonium Oxalate	May be fatal if inhaled or ingested
Ammonium Vanadate	May be fatal if inhaled or ingested
Anisidine (o-, p-isomers)	Suspected carcinogen
Antimony	May explode when subjected to high heat
Antimony Oxide	Irritant
Antimony Potassium Tartrate	Irritant
Barium Chloride	Severely toxic; 0.8 gram fatal dose
Barium Hydroxide	Highly toxic, neurotoxin
Barium Nitrate	Poison, strong oxidant, highly toxic to eyes
Benzone (Phenylbutazone)	Irritant
Benzo(a)pyrene	Suspected carcinogen
Beryllium as Be	Suspected carcinogen
Beryllium Carbonate	Irritant
Bromine	Poison, powerful oxidizer
Bromoform	Toxic by inhalation, unsuspected carcinogen
iso-Butanol	Suspected carcinogen, highly flammable
sec-Butanol	May form explosive hydroperoxides
tert-Butanol	Suspected carcinogen and mutagen, highly flammable
1,3-Butadiene	Suspected carcinogen
Butyric Acid	Suspected carcinogen and mutagen
Caffeine	Very toxic, 1 grain may be life threatening
Calcium Chromate	Suspected carcinogen
Calcium Fluoride	Mutagenic effects in animals, poison, toxic to humans
Carbol Fuchsin	Suspect animal carcinogen and mutagen
Carmine	Irritant; burning may produce carbon monoxide
Catechol	Corrosive
Chlordane	Suspected carcinogen, absorbs through skin

CHEMICAL NAME	REASON FOR RESTRICTION
Chlorinated Camphene	Suspected carcinogen, absorbs through skin
B-Chloroprene	Suspected carcinogen, absorbs through skin
Chromic Sulfuric Acid	Positive animal and human carcinogen; contains chromium trioxide, a known human carcinogen
Chromium	Known human carcinogen as dust or fume
Chromium Acetate	Irritant
Chromium (III) Chloride	Suspected carcinogen
Chromium(III) Nitrate	Known human carcinogen
Chromium (III) Oxide	Known Human carcinogen
Chromium (VI) Oxide	Suspected carcinogen
Chromium(III) Potassium Sulfate	Suspected carcinogen
Chrysene	Suspected carcinogen
Cobalt	Suspected carcinogen
Cobalt Nitrate	Oxidizer; irritant
Crotonaldehyde	Suspected carcinogen
Crystal Violet Solution	Contains known animal carcinogens and poisons
Cyclohexane	Flammable
Cyclohexanol	May form explosive peroxides as it ages
Cyclohexene	May form explosive peroxides, toxic by inhalation
p-Dichlorobenzene (HIGH SCHOOL ONLY)	Combustible, known human carcinogen
1,2-Dichloroethane	Suspected human carcinogen, animal mutagen
Dichloroindophenol Sodium	Irritant
Dieldrin	Suspected carcinogen, absorbs through skin
Diglycidyl Ether (DGE)	Suspected carcinogen
Dimethyl Sulfate	Suspected carcinogen, absorbs through skin
Epichlorohydrin	Suspected carcinogen, absorbs through skin
Ethyl Bromide	Suspected carcinogen, absorbs through skin, inhalation hazard
Ethylene Glycol	Animal mutagen, narcotic and nephrotoxin
Ethylenediamine Tetra-acetic Acid	Animal mutagen
FAA Solution	Contains formaldehyde and 90% alcohol, poison
Ferrous Sulfate	Irritant
Fuchsin	Irritant
Hematoxylin	Suspected carcinogen
Heptachlor	Suspected carcinogen, absorbs through skin
Hexachlorobutadiene	Suspected carcinogen, absorbs through skin
Hexachloroethane	Suspected carcinogen
Hexamethyl phosphoramide	Suspected carcinogen, absorbs through skin
Hydrogen Peroxide (30%)	Fire and explosion risk, severely corrosive
Hydroquinone	May be fatal if ingested
Iodine Crystal	May react violently, vapor highly toxic
Isoamyl Alcohol	Irritant; combustible liquid and vapor
Isobutyl Alcohol	Flammable
Lead(II) Acetate	Suspected animal carcinogen
Lead (VI) Chromate	May be fatal if inhaled or ingested, known human carcinogen
Lead and Lead Compounds	Poison, cumulative neurotoxin

CHEMICAL NAME	REASON FOR RESTRICTION
Lithium Nitrate	Oxidizer
Magnesium Chlorate	Irritant
Magnesium Ribbon	Irritant
Manganous Nitrate	Explosion hazard in dry form
Methyl Bromide	Suspected carcinogen, absorbs through skin
Methyl Chloride	Suspected carcinogen, absorbs through skin
Methyl Oleate	Toxic
Methylene Chloride	Possible carcinogen, may be absorbed through skin
4,4'-Methylene bis(2-chloroaniline)	Suspected carcinogen, absorbs through skin
4,4'-Methylene Dianiline	Suspected carcinogen, absorbs through skin
Millon's Reagent	Contains 11% mercury
Nessler's Reagent Solution	Poison, neurotoxin, and nephrotoxin
Nickel Carbonate	Reasonably anticipated human carcinogen
Nickel(II) Chloride	Suspected animal carcinogen
Nickel Compounds	Fumes may cause increase risk of lung cancer, many nickel compound are animal mutagens and carcinogens (also Nickel(ous) compounds)
Nickel(II) Nitrate	Suspected animal carcinogen
Nickelous Acetate	Reasonably anticipated human carcinogen
Ninhydrin	Irritant poison, biologically active
2-Nitropropane	Suspected carcinogen; ranked as one of the most hazardous (10%)compounds to ecosystems and human health.
Oxalic Acid	Neurotoxin and nephrotoxin, poison
Paraformaldehyde	Mutagen, possible animal carcinogen
Pentane	Irritant; flammable
Petroleum Ether	Flammable
o-Phenylenediamine	Suspected carcinogen
1-Phenyl-2-Thiourea	May be fatal if inhaled or ingested
Polyvinyl Alcohol	Suspected animal carcinogen
Potassium Bromate	Animal mutagen
Potassium Chlorate	Extremely explosive if slightly contaminated
Potassium Chromate	Possible human carcinogen
Potassium Dichromate	Possible human carcinogen
Potassium Ferricyanide	Decomposed to ferrocyanide upon ingestion
Potassium Nitrite	Animal mutagen and teratogen
Potassium Permanganate	Animal mutagen
Potassium Periodate	Oxidizer
Propane Sultone	Suspected carcinogen
Propylene Dichloride	Suspected carcinogen
Propylene Diamine	Suspected carcinogen, absorbs through skin
Propylene Oxide	Suspected carcinogen; extremely flammable; harmful by inhalation and ingestion.
Resorcinol	Neurotoxin
Rhodamine B	Moderately toxic, positive animal carcinogen, suspected human carcinogen, avoid all skin contact
Salol (Phenyl Salicylate)	Irritant
Saponin	Destroys red blood cells, toxic by ingestion

CHEMICAL NAME	REASON FOR RESTRICTION
Silver Acetate	Severely toxic by inhalation and ingestion
Silver Nitrate (HIGH SCHOOLS ONLY)	Oxidizer; corrosive; may be fatal if ingested
Sodium Bisulfite	Animal Mutagen
Sodium Borate	Animal mutagen, poisoning affects kidneys
Sodium Bromate	Oxidizer
Sodium Chlorate	Clothing contaminated with chlorates are extremely flammable
Sodium Fluoride	Animal mutagen
Sodium Nitrate	Oxidizer; irritant
Sodium Oxalate	Poison; fatal dose < 5 grams, nephrotoxin and neurotoxin
Sodium Silicofluoride	Toxic
Sodium Salicylate	Animal mutagen and reproductive effects
Strontium Chromate	suspected carcinogen
Sudan III or Sudan IV (SOLUTIONS ONLY)	Decomposes to oxides of nitrogen
Sulfamethazine	Irritant
Thermit	Explosive
Thymol	Tumororigenic, reproductive, and mutagenic effects in animals
Toluene	Nephrotoxin and hepatotoxin; mutagenic effects in animals
Toluene -2,4-diisocyanate	Suspected carcinogen, sensitizer (allergen)
Triethanolamine	Suspected carcinogen
Urethane (Ethyl Carbamate)	Alleged carcinogen
Vinyl Cyclohexene dioxide	Suspected carcinogen
Wright's Stain Solution	Neurotoxin
Xylenes	Reproductive and mutagenic animal effects
Zinc Acetate	Reproductive and mutagenic animal effects
Zinc Chloride	Reproductive and tumorigenic effects in animals
Zinc Oxide	Animal mutagen
Zinc Sulfate	Animal mutagen

APPENDIX H
RESTRICTED CHEMICAL REQUEST FORM

The majority of restricted chemicals need a fume hood and should only be used at high schools. Restricted chemicals are restricted by use, and/or quantities. Appendix G of the Curriculum and Professional Development *K-12 Science Safety Manual* contains a list of restricted chemicals. If restricted chemicals are present at a school, each chemical is addressed in the school's written emergency plan. Science teachers are advised to make careful decisions about the acquisition and use of laboratory chemicals. If an especially hazardous chemical is deemed essential to a laboratory activity or demonstration, the responsibility to ensure safe storage and use must be assumed by the designated teacher using the chemical and a designated site administrator. When in doubt, contact the appropriate staff from the Curriculum and Professional Development Science, Health, and Foreign Language Department.

Date: _____

Name of the chemical: _____

Quantity on hand: _____

Name of the laboratory: _____

Purpose of laboratory activity: _____
_____
_____

Identify the proper storage location of the chemical : _____
_____
_____

Teacher Signature: _____

Department Coordinator Signature: _____

Administrator Signature (to verify approval to purchase this chemical):
_____

***A copy of the laboratory activity utilizing this chemical must be stapled to this form.**

PLACE A SIGNED COPY IN THE MSDS BINDER IN SCIENCE PREP AREA AND ANOTHER COPY IN THE MSDS BINDER IN THE DESIGNATED ADMINISTRATOR'S OFFICE

APPENDIX I
SAFETY CONTRACTS AND EXAMS

It is suggested that all students and parents sign a safety contract. It is strongly encouraged that all students complete and pass a science exam before they are allowed to partake in science laboratory experiments. This exam may be teacher or department created.

For comprehensive science safety contracts or safety exams in English or Spanish go to http://www.flinnsci.com/Sections/Safety/safety_contracts.asp . You may reproduce these exams as needed for classroom instruction on safety.

APPENDIX J
SAFETY RESOURCE WEBSITES

For a wealth of science safety information, please reference the following websites:

Centers For Disease Control and Prevention/The National Institute for Occupational Safety and Health (NIOSH)
http://www.cdc.gov/niosh/

First Aid
http://www.mayoclinic.com/health/FirstAidIndex/FirstAidIndex

Flinn Scientific Safety
http://www.flinnsci.com/Sections/Safety/safety.asp

National Science Teachers Association
http://www.nsta.org/

Society For Science and the Public (International Science and Engineering Fair Guidelines)
http://sciserv.org/isef/about/rules_regulations.asp

Southern Nevada Health District
http://www.southernnevadahealthdistrict.org/index.html

United States Army Center for Health Promotion and Preventative Medicine: Guide To Poisonous and Toxic Plants
http://chppm-www.apgea.army.mil/ento/PLANT.HTM

United States Department of Labor Occupational Safety and Health Administration (OSHA)
http://www.osha.gov/

APPENDIX K
CCSD CHEMICAL HYGIENE PLAN

This document is the Clark County School District Chemical Hygiene Plan and was developed by the Risk Management Department. If you have questions feel free to contact Risk Management staff at 799-2967.

Clark County School District Chemical Hygiene Plan

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CLARK COUNTY SCHOOL DISTRICT
CHEMICAL HYGIENE PLAN

SECTION 1 – INTRODUCTION

In compliance with various Hazard Communication or “Right to Know” laws and the1990 Occupational Safety and Health Administration (OSHA) “The Laboratory Standard”— Occupational Exposure to Hazardous Chemicals in Laboratories, this plan has been designed to address the specific safety needs of those working with chemicals.

The Laboratory Standard ensures that Clark County School District employees who work with chemicals will be protected from any chemical exposure that exceeds permissible exposure limits.

This Chemical Hygiene Plan (CHP) is intended to inform all employees of the:

- Potential health and safety hazards present in their workplace.
- Precautions and preventative measures that have been established to protect employees from workplace illness or injury.
- Required safety rules and procedures established to meet the OSHA requirements.

The Chemical Hygiene Plan will be available for review to all employees upon request. Copies of the plan will be located in the following areas:

- Main offices and all CCSD school science laboratories
- Risk Management Office
- Curriculum and Professional Development (CPD) Office
- Hazardous Materials Office

The Clark County School District is required to advise you of your rights regarding the Hazard Communication Standard, Personal Protective Equipment Standard and Occupational Exposure to Hazardous Chemicals. This manual meets these requirements in part.

OSHA "Notice to Employee" poster will be posted at locations where notices are normally posted. It is to your advantage to know your rights. Take time to read the "Notice to Employee" posted in your work area.

I. GENERAL RESPONSIBILITIES OF THE CLARK COUNTY SCHOOL DISTRICT

The School Board and the School District Superintendent have ultimate responsibility to ensure the school district complies with the OSHA Standard. These tasks include:

A. Record all employee exposures to hazardous chemicals.

- Immediately notify Risk Management to record all chemical exposures and use monitoring instruments to get hard data, if necessary.
- Obtain and keep up-to-date records, including medical examination records regarding any chemical exposures.
- Please note: This provision is included in the Lab Standard, but clearly states you only have to monitor exposure levels if you know you routinely have an exposure level which is above the permissible exposure level (PEL) and an OSHA Standard exists for the chemical that requires monitoring. If you have no reason to believe you have exceeded a PEL, you do not have to monitor exposure levels.

B. Train employees to:

- Understand the hazards of chemicals they use.
- Recognize signs and symptoms associated with overexposure to hazardous chemicals.
- Properly use personal protective equipment (fume hoods, goggles, etc.)
- Protect them from chemical exposure by following procedures.
- Understand the content of the Chemical Hygiene Plan.

C. Provide all employees with access to:

- Material Safety Data Sheets (MSDS).
- The Laboratory Standard and Chemical Hygiene Plan.
- Permissible exposure limits of hazardous chemicals.

D. Upon receipt of a chemical:

- Make sure you have the MSDS (and make sure it is accessible to all).
- Make sure the container is properly labeled with the minimum information listed in Section 3, II. Labels.

Note: You must follow these steps for all chemicals and chemical solutions made and stored at your site. These are <u>minimum requirements</u>. Check for specific safe-handling requirements for all chemicals.

II. GENERAL RESPONSIBILITIES OF SITE ADMINISTRATORS

The Site Administrator has the overall responsibility for chemical hygiene plan and protocol in the workplace.

The administrator is to:

- Ensure that workers know and follow the chemical hygiene plan, that protective equipment is available and in good working order and that appropriate training is provided.
- Provide regular formal chemical hygiene and housekeeping inspections including routine inspections of emergency equipment. Inspections should be conducted using the CCSD checklist.
- Ensure that staff receives the appropriate chemical hygiene training.
- Maintain a copy of the chemical hygiene plan; employee training and exposure records, when applicable.
- Know and have an understanding of the current legal requirements concerning regulated substances.
- Determine the required type and levels of personal protective equipment and apparel.
- Ensure adequate facilities exist for the use of all materials used.
- Ensure that damaged chemical containers and/or old and outdated chemicals are changed out or removed according to CCSD's policy.

III. EMPLOYEE RIGHTS

Employees who may be exposed to hazardous chemicals have access to the following information where appropriate:

- Chemical exposure information
- Workplace chemical lists
- Material Safety Data Sheets

In addition, employees shall receive training on the hazards of chemicals and on the measures they can take to protect themselves from those hazards.

SECTION 2 – GENERAL GUIDELINES

I. STANDARD OPERATING PROCEDURES

A. General Employee Rules and Procedures

- Utilize engineering, administrative and educational (training) controls to minimize all chemical exposures.
- Skin contact with chemicals should be avoided.
- Develop a firm goggle policy. Wear appropriate personal safety equipment (PSE), e.g., gloves, fume hood, eye protection, etc., to reduce potential exposure. Chemical splash goggles must be worn any time chemicals, glassware or heat are used in a laboratory.
- Flammable liquids require special attention. Never use these materials near any source of ignition, spark or open flame.
- Never perform a first-time chemical demonstration in front of students. Always perform first-time demonstrations in front of other instructors to evaluate the safety of the demonstration.
- Always have a fire blanket easily accessible in case of an accident when using flammable materials.
- Train all employees on the use of all safety devices in the laboratory (e.g., eyewash, fire extinguisher, spill control kit, etc.).
- Prominently label the location of safety devices so they can be located quickly in an emergency.
- Know appropriate procedure in the event of a power failure.
- Know where and how to use master utility controls to shut off gas, electrical and water supplies.
- Use a safety shield whenever an explosion or implosion might occur.
- Read all chemical labels prior to use.
- Know and understand the hazards of the chemical as stated in the MSDS and other references.
- Know the locations for all personal safety and emergency equipment, eye wash, shower, fire extinguisher and spill control materials.
- Know proper transportation and disposal procedures for chemicals.
- Know appropriate emergency procedures, waste disposal, spill clean up, evacuation routes and fire/emergency notification.

B. General Site Rules and Procedures

- All employees will follow first aid and emergency procedures as outlined in the site staff handbook. All areas should have a well-stocked, accessible first-aid kit in case of an emergency.

- The area should be well ventilated in compliance with Universal and local Fire Codes. Air for ventilation should directly flow into the area from non-laboratory areas and out to the exterior of the building. (Questions concerning ventilation should be directed to the Building Engineer or Facility Service Representative.)
- Post emergency telephone numbers in the chemical storage area. Have a telephone or some means of emergency communication in the laboratory, chemical storage area and prep area.
- Do not use chipped, etched or cracked glassware. Glassware which is chipped or scratched presents a serious breakage hazard when heated or handled.
- All areas must have an eyewash station capable of treating both eyes continuously for 15 minutes with copious quantities of potable water. Teach everyone how to use the eyewash/shower quickly in case of an emergency. Eyewash effectiveness and operation should be inspected every month or as prescribed by the manufacturer. Promptly repair any eyewash that does not meet the water flow requirements as listed above. (ANSI Z358.1.)
- Do not block access to any safety equipment.
- In the event of an accident, follow instructions as listed in the CCSD Emergency Action Plan and fill out an accident report following Clark County School District procedures.
- Read all labels carefully—the names of many chemicals look alike at first glance.
- Do not operate electrical equipment with wet hands.
- Have appropriate types and sizes of fire extinguishers. Carbon Dioxide fire extinguishers are inappropriate for laboratories. A Class D fire extinguisher should be available when working with flammable solids. Fire extinguishers should be inspected according to local fire codes.
- Work and floor surfaces should be cleaned regularly and kept free of clutter.
- Do not block fire exits.
- Have an alternative evacuation route in the event your primary route becomes blocked.
- Practice your emergency plans.
- No unlabeled products should be stored anywhere at the site. Labels on all chemical containers must be typed or from the manufacturer.
- Be thoroughly familiar with the hazards and precautions for protection before using any chemical. Study the precautionary label and review its contents before using any chemical substance.
- An approved eyewash station and fire blanket should be within 25 feet of the chemical storage area.
- Dispose of all chemicals properly. All disposal procedures used should conform to state and local regulations and as prescribed on the MSDS. Contact the Environmental Services Department with questions or concerns.
- Neutralizing chemicals, such as a spill kit, dry sand, kitty litter and other spill control materials should be readily available.

- Do not hang items on the eyewash or misuse the safety equipment.

C. Safety Equipment Inspection

There are many safety items necessary for compliance to the OSHA Standard. They include, but are not limited to:

- Eyewashes Stations
- Fire extinguishers
- Goggles and other personal protective equipment (PPE)
- Chemical Spill Kits

One of the most important sections of the OSHA Standard states that all safety equipment in the facility must always be in good operating condition. While the Laboratory Standard requires some safety equipment and highly recommends other equipment, the standard is very clear on the point that if you have a piece of safety equipment, it must be functional at all times. Therefore, inspect laboratory safety equipment frequently. This statement applies to all safety equipment, required or recommended.

- Goggles always must be clean and functional.
- Ventilation must meet the Fire Code and must be tested quarterly by the building engineer and/or maintenance department.
- Fire extinguishers must be of the right type, Tri-class ABC, and they are annually inspected.
- Eyewashes must be functional and tested at least once a month.
- Fume hoods must be operational at the level suggested by the manufacturer.
- Any safety equipment failing inspection should be reported out of order and repaired immediately.

D. Electrical Safety Rules and Procedures

The Standard Operating Procedures (SOP) applies to equipment and appliances used in a laboratory; it does not address computers or other office equipment used in non-laboratory settings.

Extension Cords:

- Only use extension cords for temporary (less than three months) use. Situations that require extension cords for greater than three months are considered permanent installations and must be addressed through upgrades to building wiring systems. Extension cords should be no less than 16 gauges.
- Do not place extension cords in foot traffic areas or under equipment. Length shall be the minimum required for the specific application but shall not exceed 15 feet. Ground wires are required for all extension cords (i.e., the cord should have three prongs).

- Extension cords or surge protectors that do not have a ground pin or if the ground pin is damaged or broken should be permanently removed from service.

II. DOCUMENTATION/RECORDKEEPING REQUIREMENTS

CCSD policy is to maintain safety records as required by OSHA.

A. **Accident Reports** - Accident investigations will be conducted by the supervisor with assistance from the Risk Management Department as deemed necessary. Accident reports will be written and retained for five years.

B. **Exposure Evaluations** - Any records of exposure evaluation carried out by individual departments will be kept within the department and also sent to the Risk Management Department. Raw data will be kept for one year and summary data for the term of employment plus 30 years.

C. **Medical Consultation and Examinations** - Results of medical consultations and examinations will be kept by the Risk Management Department for a length of time specified by the appropriate medical records standard. This time will be at least the term of employment plus 30 years as required by OSHA.

D. **Equipment Inspection** - Records of inspections of equipment will be maintained for five years. Data on annual fume hood monitoring will be kept at the site. Fume hood monitoring data are considered maintenance records and as such the raw data will be kept for one year and summary data for five years.

E. **Training Records** – Training records should be kept in the employee's department file for five years. Refresher training should be given annually.

III. EMPLOYEE TRAINING

The Clark County School District provides ongoing training appropriate to the employees' assigned responsibilities. This training includes but is not limited to:

- Content and location of this Chemical Hygiene Plan (CHP).
- Potential hazards involved in using chemicals.
- Dangers of overexposure to chemicals.
- Location and availability of chemical Material Safety Data Sheets (MSDS).
- Understanding of the permissible exposure limits (PEL) of the various chemicals being used in the school.
- The proper use and location of all safety equipment.

All employees covered by this CHP will be provided with information and training to ensure that they are apprised of the hazards of chemicals present in their work area. This training will be given at the time of initial assignment and prior to new assignments involving different exposure situations.

A. Employee training must include, as a minimum:

- Physical and health hazards associated with the hazardous chemicals in the work area.
- Measures employees can take to protect themselves from these hazards.
- Methods and observations to help detect the presence or release of hazardous chemicals.
- Signs and symptoms associated with overexposures to hazardous materials.

B. Other suggested employee safety training topics/subjects:

- Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29 CFR 1910.1450)
- Location and explanation of the Chemical Hygiene Plan.
- General Laboratory Safety (annually)
- Fire Extinguisher Usage (annually)
- Hazardous Waste Operator (HAZWOPER - annually)
- CPR and First Aid (annually)
- Hazard Communication Standards (annually)
- Location of Material Safety Data Sheets (MSDS – annually)

C. Information Provided to Employees:

- The contents of the OSHA Lab Standard (29 CFR 1910.1450) and its appendices. A copy of the standard will be available to employees for review at their place of employment.
- The availability and location of the written Chemical Hygiene Plan.
- The Permissible Exposure Limits (PEL) for the substances regulated by OSHA or the Threshold Limit Values (TLV) established by ACGIH for other hazardous chemicals where there is no applicable OSHA standard.
- Location and availability of known reference material on the hazards, safe handling, storage, and disposal of hazardous chemicals found in the laboratory including, but not limited to, Material Safety Data Sheets received from chemical suppliers.

SECTION 3 – HAZARDOUS CHEMICALS

Hazardous chemical means a chemical for which there is statistically significant evidence (based on at least one study conducted according to established scientific principles), that acute or chronic health effects may occur in exposed employees, or if it is listed in any of the following:

A. OSHA, 29 CFR 1910 Subpart Z, Toxic and Hazardous Substances

B. Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment, ACGIH (latest edition)

C. The Registry of Toxic Effects of Chemical Substances, NIOSH (latest edition)

In most cases, the label will indicate if the chemical is hazardous. Look for key words like caution, hazardous, toxic, dangerous, corrosive, irritant, or carcinogen. Old containers of hazardous chemicals (pre 1985) may not contain hazard warnings.

If you are not sure if the chemical you are using is hazardous, review the MSDS or contact your supervisor or the Environmental Services Department.

I. MATERIAL SAFETY DATA SHEETS (MSDS)

Material Safety Data Sheets are a summary of the health hazards of the material and associated recommended safe work practices. MSDS are required by OSHA to be sent by chemical manufacturers to the purchasers of their chemicals. If you work in a lab, then OSHA indicates you should:

- Be aware of what an MSDS is and its relevance to your health and safety
- Be aware of how to access MSDS for your work area
- Maintain all MSDS that are received with incoming chemical shipments
- Ensure that they are readily accessible to employees during each work shift/class when chemicals are being used, handled, and/or stored in their work area(s). Electronic access is acceptable with a printer. (Written MSDS copies are required.)

If you work with chemicals, but not in a lab, you fall under the OSHA Hazard Communication Standard.

II. LABELS

A label is any written, printed, or graphic material displayed on, or affixed to, containers of chemicals.

Labels or other forms of hazard warnings, such as tags or placards, provide immediate warning of potential danger. They are used to warn of a variety of potential physical hazards, or health hazards.

The Occupational Safety and Health Administration's Hazard Communication Standard established minimum labeling requirements for most chemical containers in the workplace. All chemical containers at the lab or chemical storage area shall be labeled with:

A. The contents of the container (i.e. common name of the chemical). Chemical formulas and structural formulas are not acceptable except for small quantities of compounds synthesized in the laboratory.

B. Name and address of the manufacturer.

C. Physical and health hazards

D. Recommended protective equipment

Employees should not work with any chemical from an unlabeled container. However, portable containers intended for the immediate use, by the employee performing the transfer, do not need to be labeled. This labeling requirement also does not apply to employees assigned unknown chemicals for analysis. However, hazard information should be provided with all unlabeled chemicals.

Carefully read all the information on the label. If you do not understand something, contact your supervisor or instructor for an explanation or request the MSDS.

III. SPECIAL LABELING REQUIREMENTS

All containers that hold carcinogens, reproductive hazards or acutely toxic reagents must be properly labeled concerning the health hazard posed by the chemical. Most new reagent containers will have the chemical's hazard clearly displayed on the label. However older reagents and containers of solutions that are mixed in the lab must be properly labeled by the laboratory worker.

Environmental and personal monitoring will be necessary for substances regulated by a standard only if there is reason to believe that exposure levels for that substance routinely exceed the permissible exposure limits (PEL) for that substance. If you have no cause to suspect a hazard or an exposure, no monitoring is necessary.

IV. ROOM SIGNS

Each room must have a room sign such as Chemical Storage Area/Room, Flammables, Corrosives, etc., that provides safety information to visitors and housekeeping personnel. Prominent signs and labels with the following information will also be posted within the room:

- Identity labels, showing contents of containers (including waste receptacles) and associated hazards.
- Location signs for safety showers, eyewash stations, other safety and first aid equipment, and exits.
- Warnings at areas or equipment where special or unusual hazards exist.
- Room number, or purpose (Storage, Room # XXX)

Contact Environmental Services if emergency response or service is required in a designated area or in a laboratory. Support personnel shall contact an authorized user of the facility before performing work that may involve any of the following:

- Fume hoods
- Biological safety cabinets
- Sinks
- Placarded equipment
- Chemicals or materials on laboratory benches

V. STORAGE OF CHEMICALS

Chemicals should be stored in their original containers. Bottles of chemicals should be placed on storage shelves in such a way to minimize the danger of bottles falling off the shelf. Highly toxic materials should be stored separately from other chemicals in a room which is locked when not in use. Stored chemicals should be examined at least annually to determine the need for replacement and the integrity of the container and label.

The transportation of hazardous chemicals in buildings provides the greatest potential for chemical exposure to the building occupants. Spills occurring outside storerooms and laboratories may lead to hazardous concentrations of vapors and gases being distributed throughout the building.

Fire and explosion hazards of flammable liquids exist throughout CCSD. The safe handling of chemicals requires a basic understanding of the hazards and the steps needed to minimize them.

If incompatible chemicals are inadvertently mixed a fire, explosion, or toxic release can easily occur. Chemicals can often fall into more than one hazard category and therefore the chemical label and/or Material Data Safety Sheet (MSDS) should be reviewed for specific storage requirements. Separate chemicals by adequate distance, or preferably by using physical barriers (e.g. storage cabinets).

- Keep an updated inventory of all chemicals, their amounts and location. Stored chemicals should be examined annually for replacement, deterioration and chemical integrity. Your entire Chemical Hygiene Plan is based on the proper updated inventory always being available.
- An annual inventory of all chemicals at the site is required by State and Federal regulations and will be submitted to the Hazardous Materials Section each autumn.
- Order and store the minimum amount of chemicals needed.
- Label all chemical solutions you make with the identity of the contents, date, concentration, hazard information and your name.
- Each site is responsible for developing a system for tracking the age of chemicals. This will allow anyone to determine the age of a substance at a later date.
- Properly store all chemicals with compatible (family) chemicals.
- Store corrosives in appropriate corrosives cabinets.
- No flammable materials should be stored outside an approved flammables storage cabinet unless in safety cans.
- The storage area and cabinets should be labeled with chemical classification and safety signs to identify the hazardous nature of the products stored within. This will allow fire department officials to quickly see a potentially hazardous area.
- Never store chemicals over, under or near a sink.
- Never stack chemicals on top of each other.
- Never store liquid chemicals on shelves above solid and dry chemicals.
- Do not store chemicals under a fume hood.
- Avoid storing chemicals on shelves above eye level.
- Shelving sections should be secured to walls or floor to prevent tipping of entire sections.
- Shelves should be equipped with lips to prevent containers from rolling off.
- Chemicals should not be stored on the floor.

- Store chemicals in a separate, locked, dedicated storeroom.
- Store all poisons in a locked cabinet.
- Storage area should be ventilated. Isolate the chemical storage exhaust from the general building ventilation system.
- Never store food in a laboratory refrigerator.
- Only authorized personnel are allowed in the chemical storage area. Students should never be allowed in this area.
- Chemical exposure to heat or direct sunlight should be avoided.

VI. HANDLING OF CHEMICALS

Know the physical and health hazards associated with the chemicals you are using. Carefully read the chemical's label and MSDS before using a chemical for the first time. Also review the appropriate Standard Operating Procedure. These documents will provide any special handling information that you may need. After the potential hazards associated with the chemicals and the experimental processes are evaluated you can modify work procedures so that laboratory hazards are minimized or eliminated.

Keep the following guidelines in mind when handling chemicals:

A. Do not work alone in the laboratory. If you do need to work alone, outside of a laboratory, notify someone.

B. Use required personal protective equipment.

C. Label all containers with chemical content.

D. Wear disposable nitrile gloves to prevent skin exposure

E. Keep your hands and face clean. Wash thoroughly with soap and water after handling any chemical and whenever you leave the work area.

F. Avoid direct contact with any chemical. Always wear a full-length lab coat or a chemical-resistant apron when potential hazards may exist. Wear low-heeled shoes and. Do not wear open-toed shoes or sandals of any kind. Eye protection must be worn when potential hazards may exist. Goggles must be worn over any existing eye glasses. Chemical splash goggles must meet ANSI Z87.1 Standard. Wear face shields when dealing with corrosive liquids, (e.g., full strength acids and bases).

G. Wear gloves that offer protection for all hazards you may find in the lab. Check for holes every time you wear your gloves. Wear long pants in the laboratory - Do not wear shorts. Do not wear loose or balloon sleeves. Tie back long hair. Do not wear hanging jewelry. Do not wear a long or loose necktie. Do not wear an absorbent watch strap.

H. Clean up all chemical spills properly and promptly. See MSDS regarding proper method.

I. Never smell, inhale or taste a chemical.

J. Smoking, drinking, eating and the application of cosmetics is forbidden in areas where hazardous chemicals are used or stored.

K. Always use chemicals with adequate ventilation or in a chemical fume hood. Refer to the MSDS and the standard operating procedure to determine what type of ventilation is needed.

L. Use hazardous chemicals only as directed and for their intended purpose.

M. Inspect equipment or apparatus for damage before adding a hazardous chemical. Do not use damaged equipment.

N. Never use mouth suction to fill a pipette. Use a pipette bulb or other pipette filling device.

O. Electrically ground and bond containers using approved methods before transferring or dispensing a flammable liquid from a large container.

Compressed Gas Handling Instructions

- Compressed gases should be handled as high-energy sources, and therefore, as potential explosives.
- Always protect the cylinder valve stem.
- Avoid exposure of cylinders to heat. Do not store gas cylinders in direct sunlight.
- Never lubricate, modify, force or tamper with a cylinder valve.
- Cylinders of toxic, flammable or reactive gases should be used only under a fume hood.
- Do not extinguish a flame involving a combustible gas until the gas is shut off—otherwise it can re-ignite—possibly causing an explosion.
- Gas cylinders must be chained in place. They must be protected to prevent valve damage that may be caused by falling.

Flammable Chemicals Handling Instructions

- Store all flammables in a dedicated flammables cabinet.
- Keep cool, between 55°F and 80°F, at all times.
- Store away from all sources of ignition.
- Store away from all oxidizers.
- Never store flammables in refrigerators unless the refrigerator is explosion proof.
- Avoid storing any chemicals, especially flammable materials, in direct sunlight.

Corrosive Materials Handling Instructions

- Store corrosives in appropriate corrosives cabinets.
- Working with corrosive materials requires special eyewear. Wear a chemical splash face shield in addition to goggles when handling corrosive materials.
- Inspect all cabinets for possible corrosion. Notify the Building Engineer if problems are suspected.

Procedure Specific Safety Rules and Guidelines (for extremely hazardous chemicals)

- Never use any of the chemicals from the Prohibited Use List.
- Use a fume hood when the permissible exposure limit for a chemical is less than 50 ppm (parts per million) as indicated on the chemical MSDS. If the ppm is higher than 50, additional protective equipment must be used.
- Handle toxic, corrosive, flammable and noxious chemicals under a fume hood.

- Do not expose flammable liquids to open flame, sparks, heat or any source of ignition.
- Use flammable solids (sodium, potassium, lithium, etc.) in very small quantities. Use a safety shield when igniting flammable solids.
- Water-reactive solids (sodium metal, potassium metal, etc.) should be stored under oil.

Use extreme caution when handling finely divided (dust-like) material. Finely divided materials may form explosive mixtures with air.

VI. CHEMICAL STORAGE COMPATIBILITY CATEGORIES

Metals: All metals. Flammable solids should be stored in the flammables cabinet. Keep separate from oxidizers (including ammonium nitrate), halogens, organic compounds, and moisture.

Oxidizers: All except ammonium nitrate. Includes nitrates, nitrites, permanganates, chlorates, perchlorates, peroxides, and hydrogen peroxide 30 percent or greater. Keep separate from metals, acids, organic materials, and ammonium nitrate. Preferably, isolate oxidizers from the flammable liquids storage cabinet by a minimum of eight meters (25 feet) or by a one-hour fire wall.

Ammonium nitrate: Store in isolation from all other chemicals, especially acids, powdered metals, flammable liquids, chlorates, nitrites, sulfur, and finely divided organic combustible materials.

Bases: Strong bases—sodium hydroxide, potassium hydroxide, and other regulated bases and ammonium hydroxide. Store in a dedicated corrosive chemicals storage cabinet that has an interior constructed entirely of corrosion-resistant materials.

Acids: Inorganic (except nitric acid) and regulated organic acids. Store in a dedicated corrosive chemicals storage cabinet that has an interior constructed entirely of corrosion resistant materials.

Nitric acid: Must be stored separately from acetic acid. Store either in an isolated compartment in the acids cabinet or in special Styrofoam containers available for that purpose from vendors of chemicals. Fuming nitric acid should never be used.

Flammables: Store in a dedicated flammables storage cabinet painted with heat/flame resistant paint. Preferably, isolate flammables from all oxidizers by a minimum of eight meters (25 feet) or by a one-hour fire wall.

Poisons: Mercury and mercury compounds, nicotine, and other poisons. Use a lockable drawer remote from the acids storage cabinet.

Compressed gases: Cylinders must be chained or strapped to the wall, with caps on tight.
(a) Keep oxidizing gases remote from flammable liquids, metals, and flammable gases;
(b) Keep flammable gases remote from oxidizers and oxidizing gases by a distance of eight meters (25 feet) or by a one-hour fire-wall.

Low-hazard chemicals: Many of the salts not otherwise specified (*not* the nitrates), weak bases, oxides, carbonates, sulfides, dyes, indicators, stains, non-corrosive organic acids, amino acids, sugars, and so forth.

VII. CHEMICAL WASTE DISPOSAL GUIDELINES

Potentially hazardous chemicals must be disposed of in accordance with federal and state regulations and procedures established by CCSD Environmental Services Department. Your site may also have procedures that you are required to follow.

Contact your supervisor or Environmental Services Department. before discarding any potentially hazardous chemical. The following guidelines will assist in waste collection:

- Unless you have written approval from the Environmental Services Department., disposal of chemicals by way of the sanitary sewer system is **prohibited**.
- To determine if the chemical you want removed from your laboratory or work area is a regulated hazardous waste contact the Environmental Services Department. (799-0990), or consult the EPA regulation 40 CFR 261-Identification and Listing of Hazardous Waste.
- All staff members must be familiar with the location and composition of all wastes produced in the lab or worksite.
- Waste containers must remain closed except when actually adding waste. Open containers violate state and federal waste regulations.
- For disposal information or waste pickup, call the Environmental Services Department. (799-0990)
- Waste chemicals must not be placed or left for removal in hallways.
- For sharps or other infectious waste contact the Environmental Services Department.

SECTION 4 – SPILL AND ACCIDENT PROCEDURES

I. CHEMICAL SPILLS

Anticipate spills by having a hazard safety analysis and the appropriate safety equipment on hand.

If a spill occurs immediately alert personnel in the area and do what is necessary to protect life. Confine the spill if possible. Call for assistance if the spill is large and/or a threat to employees or the public.

Spill control or spill containment is required to comply with EPA regulations for workplace safety when hazardous chemicals/materials are involved. Containment (secondary) provides a measure against accidental spills in the workplace.

a. Any spill involving a hazardous chemical or material should be cleaned up immediately; using a CCSD authorized spill control kit. Spill control kits can be purchased commercially or self assembled.

b. The Environmental Services Department (799-0990) has a trained team of emergency responders and should be contacted **IMMEDIATELY** for assistance of any clean-up projects the staff is unprepared to handle.

c. Follow published site evacuation procedures.

d. Notify—Call for help.

e. Evacuate—Get everyone to a safe location.

f. Assemble—Organize all employees.

g. Report—Fill out a detailed accident report after the emergency is over.

h. Clean up spills immediately and thoroughly. Follow approved spill cleanup procedures.

II. SPILL CONTROL KITS

Controlling or containing spills may be accomplished, using a spill control kit.

A commercially available spill control kit from a supplier may include:

- Nine one-liter adsorbent “pillows”
- Eight adsorbent pads
- One pair of nitrile gloves
- One pair of specialty over-gloves
- One pair of goggles
- Two disposal bags

A spill control kit, self assembled, which includes:

- An absorbent, e.g. vermiculite (5 lbs.)
- Goggles (2)
- A labeled rubber 5 gallon bucket with a lid
- A scoop
- Two pairs of gloves (both inner and outer)
- Heavy plastic disposal bags (3)
- Sodium bicarbonate (1 lb. for acid neutralization)
- Absorbent pads or pillows (6)

Consult CCSD’S Environmental Services Department regarding your specific needs.

****ONCE USED, REPLACE IMMEDIATELY!****

III. FIRE AND FIRE RELATED EMERGENCIES

If you discover a fire or fire-related emergency, such as abnormal heating of material, hazardous gas leaks, hazardous material or flammable liquid spill, smoke, or odor of burning, immediately follow these procedures:

Activate the building alarm (fire pull station); if not available or operational, verbally notify persons in the building.

1) Call 911
2) Notify School Administrators - Call for help.
3) *Follow published site specific emergency action plan procedures.*
4) Evacuate - Get everyone to a safe location.
5) Assemble - Organize all employees.
6) Report - Fill out a detailed accident report after the emergency is over.
7) Isolate the area and evacuate the building:
   - Shut down equipment in the immediate area (if possible).
   - Close doors to isolate the area.
   - Use a portable fire extinguisher if you have received the proper training to operate one, or control a small fire, if possible.
8) Identify yourself to emergency personnel. Provide the fire or police teams with the details of the problem upon their arrival. Any special information you can provide is essential.

If the fire alarms are ringing in your building:

- Evacuate the building.
- Move away from the building to a designated area.
- Stay clear of driveways, sidewalks and other means of access to the building.

If you are a supervisor, account for your employees and report any missing persons to the emergency personnel at the scene. Assist emergency personnel as may be requested. Do not re-enter the building until directed to do so. Follow any special procedures established for your site.

IV. EXPOSURE REPORTING

It is the communicated policy of the Clark County School District to investigate all suspected overexposures to chemicals in a prompt and timely fashion. All employees should use the established accident reporting form for any suspected overexposure.

In the event of an overexposure, after the immediate event, the supervisor will document all chemicals and circumstances involved in the overexposure. This information should be used to change safety practices to further improve safety. These files will be maintained by the Clark County School District and made accessible to the involved employee(s).

Signs of overexposure are numerous; they can include:

- Accidental breakage, spill or leaking of a hazardous material container.
- A skin rash or irritation occurring because of contact with a chemical.
- Caustic splash to eyes, face or body.
- Symptoms such as nausea, dizziness and others.
- Difficulties in breathing.

If monitoring of the air is determined to be necessary, the results of the monitoring must be made available to the employee(s) within 2 weeks.

SECTION 5 - MEDICAL

I. MEDICAL EVALUATIONS

It is the policy of the Clark County School District to make medical consultation and examination available to our employees when:

- Any sign or symptom of an overexposure to a chemical is present.
- Monitoring has indicated an overexposure to a chemical has occurred.
- There has been a spill or uncontrolled release of chemical fumes.

The Clark County School District will provide the physician with the names of the chemicals used, circumstances of the exposure and all signs and symptoms of the exposure.

The medical examinations dealing with the overexposure must be documented and other employees working under the same conditions must be notified. All documentation must be kept on file with the Risk Management Department of the Clark County School District and the location where the overexposure occurred. This documentation of overexposure should be accessible by other employees working in this area. An individual's personal medical information will not be released to other employees.

All medical examinations and consultations should be performed by or under the direct supervision of a licensed physician in accordance with CCSD procedures.

II. MEDICAL CONSULTATION

Medical surveillance by a licensed physician is provided at no cost to the employee by the CCSD when:

- An employee exhibits signs or symptoms associated with exposure to a hazardous chemical utilized in their job;
- A spill, leak, or explosion occurs resulting in the likelihood of a hazardous exposure;
- An employee is exposed routinely above the action level, or in the absence of an action level, above the permissible exposure limit of a substance for which there are exposure monitoring or medical surveillance requirements.

III. MEDICALLY RELEVANT INFORMATION

When an employee has been exposed to a hazardous chemical, the Site Administrator should provide the examining physician with the identity of the chemicals, Material Safety Data Sheet, a description of exposure conditions, and the person's symptoms, if any. The physician's opinion must be written and indicate any need for follow-up, results, any increased risk, and a statement that the patient has been notified of these items.

IV. PERSONAL CONTAMINATION

Do what is necessary to protect life. Remain calm. The MSDS for the chemical will contain special first aid information.

Do not move an injured person unless they are in further danger. A blanket should be used immediately to protect the victim from shock and exposure. Get medical attention promptly by:

- Call 911, and/or
- Poison Information Center 215-655-3389
- *Following published site specific emergency action plan procedures, or*
- Notifying School Administrators/competent person of a - Call for help.
- Evacuate - Get everyone to a safe location.
- Assemble - Organize all workers.
- Report - Fill out a detailed accident report after the emergency is over.

V. CHEMICALS SPILLED OVER A LARGE AREA OF THE BODY

For specific instruction regarding personal contamination, contact your supervisor or the CCSD Environmental Services Department.

Quickly remove all contaminated clothing while using the safety shower or other available source of water. Immediately flood the affected body area in cold water for at least 15 minutes. Wash off chemical with water but do not use neutralizing chemicals, unguents, creams, lotions, or salves.

Get medical attention promptly.

VI. CHEMICALS ON THE SKIN (IN CONFINED AREAS)

Immediately flush with cold water. If there is no visible burn, scrub area with warm water and soap. Remove all jewelry to facilitate removal of any residual material.
If a delayed reaction is noted (often the next day), report immediately for medial attention and explain carefully what chemicals were involved.
If the incident involves Hydrofluoric acid (HF), seek immediate medical attention.
If there is any doubt, **seek immediate medical attention**.

VII. CHEMICALS IN THE EYES

Irrigate with plenty of cool water for at least 15 minutes. Check for and remove contact lenses.

Get medical attention promptly.

VIII. SMOKE AND FUMES

Anyone overcome with smoke or chemical fumes should be removed to uncontaminated air and treated for shock. If certified, follow standard CPR protocols. Get medical attention promptly.
Do not enter the area if a life threatening condition still exists, such as the presence of:

- Oxygen depletion or deficiency
- Explosive vapors
- Cyanide gas, hydrogen sulfide
- Nitrogen oxides, carbon monoxide

Get medical attention promptly.

IX. BURNING CLOTHING

Extinguish burning clothing by dousing with cold water or use emergency shower or the drop-and-roll technique. Cover injured person to prevent shock.

Get medical attention promptly.

X. INGESTION OF HAZARDOUS CHEMICALS

Call 911 Immediately.

Identify the chemical ingested and provide the relevant information to EMS, Poison Control Center (215-655-3389) and CCSD Risk Management Office at 799-2967.
Wrap injured person to prevent shock.
Provide the ambulance crew and physician the chemical name, MSDS, and any other relevant information.

XI. INDUSTRIAL TOXICOLOGY OVERVIEW

Employees must notify their immediate supervisor of all illness and injuries related to exposure to hazardous chemicals. Contact your supervisor or administrators if you have any questions regarding the procedure for treating a non-serious injury or illness.

Do not move a seriously injured person unless they are in further danger. Dial 911. Tell the dispatcher the location and nature of the emergency.

SECTION 6 – GLOSSARY

ACGIH - The American Conference of Governmental Industrial Hygienists is a voluntary membership organization of professional industrial hygiene personnel in governmental or educational institutions. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLV) for hundreds of chemicals, physical agents, and biological exposure indices.

Acid - A substance that dissolves in water and releases hydrogen ions (H+); acids cause irritation, burns or more serious damage to tissue, depending on the strength of the acid, which is measured by pH.

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.

ASPHYXIANT - A chemical (gas or vapor) that can cause death or unconsciousness by suffocation. Simple asphyxiants such as nitrogen, either use up or displace oxygen in the air. They become especially dangerous in confined or enclosed spaces. Chemical asphyxiants, such as carbon monoxide and hydrogen sulfide, interfere with the body's ability to absorb or transport oxygen to the tissues.

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.

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 are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace.

Combustible liquid means any liquid having a flashpoint at or above 100 deg. F (37.8 deg. C), but below 200 deg. F (93.3 deg. C), except any **mixture** having components with flashpoints of 200 deg. F (93.3 deg. C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

Competent Person is a person who has technical knowledge of the use and control of the chemicals at the facility and the authority to make changes or terminate the laboratory process.

Compressed gas means:

(i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F (21.1 deg. C); or

(ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg C) regardless of the pressure at 70 deg. F (21.1 deg. C); or

(iii) A liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 C) as determined by ASTM D-323-72.

Designated area means an area which may be used for work with "select carcinogens," reproductive toxins or substances which have a high degree of acute toxicity. A designated area may be the entire laboratory, an area of a laboratory or a device such as a laboratory hood.

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 that may be exposed to hazardous chemicals in the course of his or her assignments.

Explosive means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Flammable means a chemical that falls into one of the following categories:

(i) **Aerosol, flammable** means: an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame protection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;

(ii) **Gas, flammable** means: (A) a gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less; or (B) a gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit.

(iii) **Liquid, flammable** means: any liquid having a flashpoint below 100 deg F (37.8 deg. C), except any mixture having components with flashpoints of 100 deg. C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

(iv) **Solid, flammable** means: a solid, other than a blasting agent or explosive as defined in § 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

Flashpoint means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested.

Hazardous chemical means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems and agents which damage the lungs, skin, eyes, or mucous membranes.

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 is designed to be easily and safety manipulated by one person.

Laboratory-type hood means a device located in a laboratory, enclosure on five sides with a movable 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.

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.

Organic peroxide means an organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Oxidizer means a chemical other than a blasting agent or explosive as defined in § 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer pyrophoric, unstable (reactive) or water-reactive.

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 means chemicals which affect the reproductive chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

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:

- 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);

- After repeated skin application of less than 300 (mg/kg of body weight) per week; or
- After oral dosages of less than 50 mg/kg of body weight per day.

Threshold Limit Value (TLV)

Airborne concentrations of substances devised by the ACGIH, which represents conditions under which it is believed that nearly all workers may be exposed, day after day, with no adverse effect. TLVs are advisory exposure guidelines, not legal standards, which are based on evidence from industrial experience, animal studies, or human studies when they exist. There are three different types of TLVs. They are:

Time Weighted Average (TLV-TWA)
Short Term Exposure Limit (TLV-STEL)
Ceiling (TLV-C). See also **PEL**

Time Weighted Average (TWA)

The average time, over a given work period (ex., 8-hour workday), of a person's exposure to a chemical or an agent. The average is determined by sampling for the contaminant throughout the time period. Represented as TLV-TWA.

Unstable (reactive) means a chemical which is the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

Water-reactive means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

REFERENCES

Internet References:

http://www.ehs.uiuc.edu/css/guidesplans/chyp/index.aspx?tbID=gp

http://www-safety.deas.harvard.edu/chp-das.html

http://ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lschemosha.htm

http://www.ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lschemContentsCHP.htm

http://www.ehs.berkeley.edu/healthsafety/chp.html

http://www.ehrs.upenn.edu/programs/labsafety/default.html#

http://www.ehrs.upenn.edu/programs/labsafety/labsafety_manual.html

http://www.ehrs.upenn.edu/resources/waste/chem/default.html

University of Vermont Environmental Safety Facility

http://esf.uvm.edu

Laboratory Chemical Safety Summaries

http://www.hhmi.org/science/labsafe/lcss/start.htm

Material Safety Data Sheets

http://hazard.com/msds

OSHA Regulations and Technical Information

http://www.osha-slc.gov

http://www.ehrs.upenn.edu/resources/index.html

www.bradley.edu/las/chm/Safety/chemical_hygiene_plan.htm

http://www.drs.uiuc.edu/css

Appendices

Appendix B

RECOMMENDED SITE SELF-INSPECTION CHECKLIST

As part of a CCSD/OSHA requirement for an effective Injury and Illness Prevention Program (IIPP) as well as a requirement by the Federal Environmental Protection Agency (EPA), all workspaces are required to perform and document self-inspections annually. The attached Self-Inspection Form will help document safety inspections and will assist CCSD administrators, educators' and support staff in identifying and correcting many common, unsafe practices and conditions. The unsafe practices and conditions identified on this form are prohibited by state laws or CCSD policies, or are not generally accepted as safe practices.

The procedures for completing this form are as follows:

1. Designate a qualified individual to inspect each area using this form, or an equivalent.
2. Give a photocopy of the completed form to your Facility Administrator.
3. Correct each identified deficiency as soon as possible and document the correction on the original form.

Site must keep the original form on file for at least one year, so that it will be available to employees, and other interested parties, if requested. Please check the boxes indicating Yes (satisfactory), No (needs correction), or N/A (not applicable). For all "No" answers, please indicate the date the issuer responded in the "Completion Date" section. There is space at the end of the form to write comments.

1. Chemical Hygiene Plan (CHP) has been completed or updated within the last 12 months. **Corrective Action**: Contact your Administrator or Risk Management Department (799-2967) if you need a CHP. Completion Date: ————————————————	**Yes** **No** **N/A**
2. All personnel have reviewed the CHP and documented their understanding by signing the last page. Completion Date: ————————————————	**Yes** **No** **N/A**
3. Aisles, exits and hallways are clear of obstructions and slipping or tripping hazards. There should be at least 28 inches of clearance for aisles. Completion Date: ————————————————	**Yes** **No** **N/A**

4. Are there 18 inches of clearance from the top of stored materials to the ceiling with fire sprinklers (24 inches if no sprinklers are present)? **Yes No N/A**

Completion Date: ———————————————

5. Excess materials are stored in neat, secure manner that provides easy access and reduces the potential for falling, collapsing, rolling or spreading of the material. **Yes No N/A**

Completion Date: ———————————————

6. Sufficient open space is available within the site to manage the acquisition and disposition of materials. **Yes No N/A**

Completion Date: ———————————————

7. Overhead storage is limited to lightweight, non-hazardous items. **Yes No N/A**

Completion Date: ———————————————

8. Equipment, chemicals, glassware and supplies not in regular use are stored in areas other than workstations. **Yes No N/A**

Note: Remove unwanted chemicals through Hazardous Materials at 799-0990.

Completion Date: ———————————————

9. Food is eaten or stored only in designated areas. **Yes No N/A**

Completion Date: ———————————————

10. Spills are cleaned up promptly. No puddles, powders, or unknown materials on floors or work surfaces. **Yes No N/A**

Completion Date: ———————————————

11. Personal desk spaces and other "clean areas" are kept free of all hazardous research materials. **Yes No N/A**

Completion Date: ———————————————

HAZARDOUS MATERIALS

12. All chemical containers (including squirt bottles and unwanted hazardous materials containers) are clearly labeled with contents and primary hazard(s) and are in good condition (not corroded or leaking).

Yes
No
N/A

Note: Label all chemical containers and replace those that are corroded or leaking. Chemical containers must be kept closed when not in use.

Completion Date: ———————————————

13. Chemical containers, supplies and equipment are stored away from the edges of benches and shelves unless shelf lips or other restraints are in place. Precariously stored items are to be relocated.

Yes
No
N/A

Completion Date: ———————————————

14. Corrosives are stored below eye level.

Yes
No
N/A

Completion Date: ———————————————

15. Containers of hazardous chemicals [1-gallon (4-liters) or larger] are stored in secondary containment to contain a spill.

Yes
No
N/A

Note: Provide secondary containment such as chemically resistant tubs or coated bottles. The container should be equal or greater in size than the primary.

Completion Date: ———————————————

16. Containers of hazardous chemicals are not stored on the floor. When unavoidable, all containers are to be stored in plastic tubs or other secondary containment.

Yes
No
N/A

Completion Date: ———————————————

17. Peroxide formers (such as isopropyl ether, tetrahydrofuran and diethyl ether) are stored away from light and heat and labeled with the opened and expiration date.

Yes
No
N/A

Note: If these chemicals are present and have not been used for a long time, do not handle; contact Hazardous Materials at 799-0990 and ask for assistance.

Completion Date: ———————————————

18. Incompatible chemicals stored appropriately (e.g., acids separate from bases, oxidizers separate from flammables)

Yes
No
N/A

Completion Date: ———————————————

19. Chemical containers are not stored directly on top of one another (unless in original shipping boxes that can be safely stacked), or with incompatible chemicals. **Yes No N/A**

Completion Date: ———————————————

20. Each refrigerator and freezer is labeled as either "safe" or "unsafe" for storage of flammables. **Yes No N/A**

Note: Contact Hazardous Materials at 799-0990 or Risk Management at 799-2967 for assistance in determining if refrigerators are suitable for storage of flammables.

Completion Date: ———————————————

21. Hazardous materials are not stored in refrigerators that contain food. **Yes No N/A**

Note: Label all refrigerators and microwave ovens as "Food Only" or "No Food."

Completion Date: ———————————————

22. The chemical inventory has been completed or updated within the last year (or within 30 days of a significant change - such as a move to a new location or addition of new chemicals), and submitted to the appropriate CCSD personnel. **Yes No N/A**

Note: Update and submit the chemical inventory to Hazardous Materials at 799-0990 or contact Hazardous Materials with any questions, or for assistance regarding the Chemical Inventory Program.

Completion Date: ———————————————

EQUIPMENT

23. Access to Emergency Eyewash/safety shower access is free of obstructions. **Yes No N/A**

Completion Date: ———————————————

24. Emergency eyewashes tested (flushed) monthly and tests documented on tag. **Yes No N/A**

Note: Document each test on an attached tag.

Completion Date: ———————————————

26. Fire extinguisher access is free of obstructions. **Yes No N/A**

Completion Date: ———————————————

27. Access to Chemical storage cabinets is free of obstructions. **Yes No N/A**

Completion Date: ———————————————

28. Fume hood access is clear. **Yes No N/A**

Completion Date: ———————————————

29. Fume hoods are free of clutter and not used for long-term storage of equipment, chemicals or supplies not regularly used. Storage of large equipment can affect proper airflow and containment of fume hood (always work more than 6" in from the front of the hood). **Yes No N/A**

Completion Date: ———————————————

30. Safety Inspection sticker on fume hood indicates a hood airflow test within the last 12 months. **Yes No N/A**

Note: There should be a sticker or documentation that indicates the date the hood was checked and whether the airflow is satisfactory. It is generally 100-150 feet per minute).

Completion Date: ———————————————

31. Protective glass sashes on fume hoods are clear of postings and writing. **Yes No N/A**

Completion Date: ———————————————

32. Sharp objects are stored safely (to prevent accidental cuts or punctures). **Yes No N/A**

Completion Date: ———————————————

HAZARDOUS MATERIALS

33. Waste container(s) access is clear. **Yes No N/A**

Completion Date: ———————————————

34. Approved sharps waste containers are available for disposal of needles, blades and other sharps. **Yes No N/A**

Note: Train all laboratory personnel to avoid bending, cutting lab dissecting knives, or blades. (Do not put broken glass in the general laboratory trash; put it in a separate and properly labeled container that can be disposed of safely)

Completion Date: ———————————————

35. Containers of unwanted materials emptied on a regular basis and not overflowing. **Yes No N/A**

Note: If you are having problems with overflowing trash contact your site administrator. Contact Hazardous Materials at 799-0990 if your hazardous material is not being picked up in a timely fashion.

Completion Date: ———————————————

ELECTRICAL SAFETY

36. Electrical panel access is clear (at least 36 inches in front). **Yes No N/A**

Completion Date: ———————————————

37. High voltage equipment is clearly labeled, properly guarded, and its use is restricted to trained personnel only. **Yes No N/A**

Note: Label all high voltage equipment (with voltage >600 volts) with appropriate warning. Restrict use of this equipment to properly trained personnel.

Completion Date: ———————————————

38. Extension cords are used only as temporary wiring (<30 days) and not connected in a series (daisy chained) with other extension cords or power strips. (Cords must be in good condition with no breaks in insulation or exposed wiring.) **Yes No N/A**

Note: Damaged cords must be replaced or repaired.

Completion Date: ———————————————

ERGONOMICS

39. Ergonomic evaluations are done for those who have requested an ergonomic evaluation. **Yes No N/A**

Corrective Action: Contact your supervisor.

Completion Date: ———————————————

41. Leg space beneath benches and desks is not used for storage in a way that prevents proper ergonomic posture. **Yes No N/A**

Completion Date: ———————————————

REMINDER

It is recommended that furniture and equipment over four feet tall be bolted to the wall or otherwise secured.

OTHER HAZARDS

List any other hazardous conditions in need of correction that are not covered on this general self-inspection form. Assign and document correction of each hazardous condition or concern.

1. _____
2. _____
3. _____

OTHER COMMENTS

The space provided below can be used to comment on any conditions described in the above questions.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Inspection Performed by: _____ _____

Print name **Date**

CCSD
CLARK COUNTY
SCHOOL DISTRICT

CLARK COUNTY SCHOOL DISTRICT
SUPERVISOR'S ACCIDENT/INCIDENT INVESTIGATION REPORT

This report shall be completed in accordance with CCSD Safety Standard A-2.

Location Code:	Date of Occurrence	Time AM PM	Site or School Name	Date Reported

For near miss incidents, proceed to incident description below double line. For vehicle related accidents, Form CCF-102 shall also be completed and submitted to Risk Management within 24 hours. For on the job injury or occupational disease, the state required C-1 form must be completed.

INJURY/ILLNESS

Injured's Name | Age

Job Title | Department

Body Part Injured | Type of Injury

Object/Equip./Substance Inflicting Injury

Witnesses (Name & Title)

Property and Vehicle Damage

Description of Property or Vehicle Damage

Type of Damage

DESCRIPTION

Describe clearly where (classroom #, kitchen, playground, etc.) and how the accident/incident occurred:

Is there a published CCSD Safety Standard or Directive on the injuring work activity? ☐ Yes ☐ No ☐ Unknown
If yes, was it complied with? ☐ Yes ☐ No

ANALYSIS

What acts, failures to act and/or conditions contributed most directly to this accident/incident? (See back of third copy for examples.)

What are the specific reasons for the existence of these failures, acts and/or conditions? (See back of third copy for examples.)

Loss Severity Potential (see back of third copy)
☐ Major ☐ Serious ☐ Minor

Probable Recurrence Rate (see back of third copy)
☐ Frequent ☐ Occasional ☐ Rare

PREVENTION

What action has or will be taken to prevent recurrence? Place X by actions already completed. Please be specific. (See back of third copy for examples.)

Investigating Supervisor/Title	Date	Reviewed by/Title	Date

1st. Copy: SAFETY OFFICE 2nd. Copy: REGION/DIVISION 3rd. Copy: SITE
575

ANALYSIS & PREVENTION EXAMPLES

(Note: These Are Only Examples)

ACTIONS:

Some examples of possible contributing **actions**:

- Failed to use proper equipment
- Used defective equipment
- Used equipment unsafely
- No protective equipment
- Safety Standard deviation
- Used wrong tool/equipment

CONDITIONS:

Some possible examples of contributing **conditions**:

- Poor housekeeping
- Defective equipment
- Proper equipment unavailable
- Unexpected student actions
- Unsafe attire
- Fall hazards

REASONS:

Some possible examples of **reasons** action and condition hazards were present:

- Unaware of hazard
- Low level job skill
- Rule infractions
- Safety inspection failure
- Wear, deterioration, abuse
- Faulty design/construction

PREVENTION:

Some possible examples of **preventative actions** to be taken:

- Instruct/reinstruct employees
- Publish written guideline/standard
- Repair/replace equipment
- Improve design/procedure
- Discipline employee
- Obtain safer material/equipment

SEVERITY AND RECURRENCE POTENTIAL GUIDELINE

LOSS SEVERITY POTENTIAL		PROBABLE RECURRENCE RATE	
MAJOR	Future occurrences could result in property losses greater than $25,000 or injuries resulting in 10 days or more away from work.	***FREQUENT***	Similar accidents/incidents likely to occur one or more times per month.
SERIOUS	Future occurrences could result in property losses between $1,000 and $25,000 or injuries resulting in restricted duty or up to 10 days off duty.	***OCCASIONAL***	Similar accidents/incidents likely to occur 1 to 12 times per year.
MINOR	Future occurrences could result in property losses up to $1,000 or First Aid treatment injuries only.	***RARE***	Similar accidents/incidents unlikely to occur in future or likely to occur less than once per year.