Inspiring Excellence

LAKE STEVENS
School District

Chemical Hygiene Plan

Lake Stevens School District
Chemical Hygiene Plan

Adopted – January 2015

SECTION 1 –INTRODUCTION, ROLES AND RESPONSIBILITIES

Overview

Laboratories in the state of Washington are required to have written chemical hygiene plans to protect staff from health hazards and keep chemical exposure below mandated limits. Instituted in 1990 by OSHA, the Laboratory Standard is designed to address specific safety needs of any laboratory. The Laboratory Standard ensures that staff working in a laboratory setting shall be protected from any chemical exposures that exceed permissible exposure limits and shall be educated about the hazardous nature of chemicals used in the laboratory. The Lake Stevens School District (District) has the ultimate responsibility to ensure that all schools and work sites comply with the Laboratory Standard.

The District's Chemical Hygiene Plan (CHP) describes practices, procedures, equipment and facilities to be used by staff, students, visitors and other personnel working in laboratories where chemicals, flammables and potentially hazardous materials exist. By following the practices and procedures within the CHP, students and adults shall be protected from any chemical exposure that exceeds permissible exposure limits and educated as to the hazardous nature of the chemicals they use.

The purpose and intent of the District's CHP are:

- Protect staff from health hazards associated with hazardous chemicals in the laboratory.
- Define roles and responsibilities for implementation of the District's CHP.
- Inform staff of the Laboratory Standard in WAC 296-828-100 and its related regulations.
- Define and implement required training for staff per WAC 296-828-20015.
- Define and implement basic procedures for the ordering, receiving, using and storing of chemicals.
- Delineate permissible exposure levels (PEL) that do not require routine monitoring as well as exposure levels that do require monitoring.
- Keep chemical exposures below established PEL, as specified in WAC Chapter 296-841, Airborne Contaminants.
- Implement a system to record all employee exposures to hazardous chemicals using a District Incident Report and ensure these records are available to staff.
- Provide means for staff to access medical and exposure records.
- Ensure an annual review and evaluation process for the District's CHP.

Introduction to the Chemical Hygiene Plan

The purpose of this document is to create a safe laboratory environment for the use of students and staff as they conduct science lessons, experiments and demonstrations.

This document focuses on practices, procedures and equipment to be used by each school's Chemical Hygiene Officer. Our goal is to provide the Chemical Hygiene Officers with the means to make this

responsibility less burdensome and confusing, while maintaining a high level of understanding of laboratory safety practices.

The intent of this document is to:

- Protect staff from health hazards associated with hazardous chemicals in the laboratory.
- Describe practices that must be established to maintain lab safety.
- Provide procedures to implement and maintain those practices.
- Provide inventory logs, chemical storage charts and other tools to help maintain a safe and functional laboratory.
- Ensure an annual safety review and evaluation process is conducted.

Introduction

A CHP is a written program designed to minimize the health hazard risks to employees of the District associated with hazardous chemicals used in school laboratories. Laboratories in the United States are required to write and effectively implement a CHP under the OSHA Lab Standard, 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in the Laboratories). This standard is administered in Washington State by the Washington Department of Labor and Industries (L&I) through Chapter 296-828 WAC, Hazardous Chemicals in Labs.

Development and Implementation of the CHP

- This CHP is a written program developed and implemented by the District.
- Successful development and implementation of this CHP needs the full commitment of administrators at all schools, science teachers, science students and parents/guardians.
- Success and sustainability of the CHP depends upon the cooperation of all stakeholders in chemical hygiene and laboratory safety.

Purpose of the CHP

- Provides information to help protect employees, students and others working in school laboratories from health hazards associated with hazardous chemicals in the laboratory.
- Details the processes and precautions intended to minimize chemical exposure.
- Establishes a chain of command to handle specific safety responsibilities within the District and specific school sites.
- Protects the environment from contamination due to hazardous chemicals utilized in the school laboratory.
- Ensures appropriate management of chemicals in the District.

Employees Covered by the CHP

- Individuals assigned to a laboratory workplace who may be exposed to hazardous chemicals in the course of their work assignment (teachers).
- Employees who, because of their work assignments, may be required to enter a laboratory where potential exposures may occur (administrators, maintenance, custodial staff).
- Occasional visitors to the laboratory are not included in the definition of employees; however, it is prudent to require all visitors wear appropriate eye protection and protective apparel if they visit during a time when lab operations are under way.

Availability and Review of the CHP

- The CHP will be available to all employees on the district server for review and copies will be located in other areas within the District as deemed appropriate by the Superintendent/ designee.
- The District's CHP will be reviewed on an annual basis and updated as necessary. The Chemical Hygiene Committee consists of each school's Chemical Hygiene Officer and the District Safety Specialist.

Chemical Hygiene Responsibilities

Administrators

The Superintendent of the District has the ultimate responsibility for the CHP for the District and must, with other employees, see that it is implemented and provided with continuing support. The Superintendent has the responsibilities of the Chemical Hygiene Officer and may appoint qualified designees.

At the site level, the principal has the ultimate responsibility for the school CHP and must, with other employees, see that it is implemented and provided with continuing support.

Chemical Hygiene Officer

- Coordinates the District's chemical hygiene planning activities.
- Maintains records detailing efforts and results of:
    - Safeguards to minimize employee exposure,
    - Exposure monitoring, if applicable,
    - Accidents and incidents reports, and
    - Medical consultations and examinations.
- Provides access to the CHP.
- Provides technical assistance on the CHP to schools and employees.
- Conducts ongoing evaluations of chemicals being used in the District.
- Ensures that employees are provided with necessary training for compliance of the CHP.
- Monitors the standards and requirements concerning hazardous substances.
- Coordinates the CHP with the Accident Prevention Plan, first aid training, the Personal Protective Equipment Plan and bloodborne pathogens training requirements.
- Approves the purchase of all chemicals for their assigned school/building.
- Coordinates the CHP annual review and updates as needed.
- Ensures the availability of Safety Data Sheets (SDS) and relevant reference materials.
- Maintains SDS for all chemicals including household chemicals.
- Stays abreast of current information that may affect laboratory safety.
- Maintains a list of site-specific Chemical Hygiene Officers in the schools and works with these individuals to monitor procurement, usage and disposal of chemicals used in the school laboratory program.

- Communicates current information that may affect laboratory safety to science teachers and is responsible for sustainability of the CHP.
- Works with the District Safety Specialist and other levels of administration in matters of chemical hygiene and laboratory safety.
- Stays abreast of current information that may affect laboratory safety.

Science Teachers

Each science teacher is responsible for:

- Planning and conducting laboratory operations in accordance with the CHP.
- Instructing and demonstrating appropriate chemical hygiene habits and laboratory safety procedures to students.
- Following approved protocols to procure equipment and materials.
- Reporting accidents and incidents.
- Reporting/documenting issues and concerns related to lab safety and chemical hygiene.
- Requesting information and/or training when unsure about appropriate procedures or attributes of a hazardous chemical.
- Having each student and their parent/guardian sign a science safety contract at the beginning of the school year and keeping these on file.
- Ensuring pregnant teachers and students procure approval from their doctor before handling chemicals in the laboratory.

Students

Appropriate chemical hygiene and laboratory safety tenets must be taught to and demonstrated by all students who use the laboratory. Lab reports should show clear evidence of adherence to safety protocols. Assurance that students understand laboratory safety tenets should be assessed throughout the year.

General Guidelines for Working with Chemicals

- It is essential to minimize chemical exposure to the greatest extent possible. Because few laboratory chemicals are without hazards, precautions for handling all chemicals should be exercised. As a rule, skin contact with chemicals should always be avoided.
- Avoid an underestimation of risk. Exposure to laboratory chemicals should be minimized even for substances of no known significant hazard. Special precautions should be taken for those substances that have special health hazard risks. One should assume that any mixture of substances will be more toxic than either of its single components alone. One should also assume that all substances of unknown toxicity are toxic.
- Adequate ventilation must be provided. The best way to prevent exposure to hazardous substances is to prevent their escape into the atmosphere by use of fume hoods and other ventilation controls.
- Institute a Chemical Hygiene Committee to minimize exposures to toxic substances. It is recommended under both the OSHA and WISHA Laboratory Standards.

- The OSHA Permissible Exposure Limits (PEL) and the American Conference of Governmental Industrial Hygiene Threshold Limit Values (TLV) should not be exceeded.

SECTION 2 – CHEMICALS

School Chemicals List Guidelines

King County's "Rehab the Lab Program" provides an on-line database of school laboratory chemicals at www.schoolchemlist.org. This School Chemicals List provides a quick reference to laboratory chemicals and their hazards, appropriate K-12 grade levels, and proper storage location. Appendix B and C of this document contain tables and figures taken from the Rehab the Lab Program.

All science teachers in the District should familiarize themselves with this website and the appendices to this CHP when considering working with unfamiliar chemicals.

General Rules and Procedures

Staff members shall understand the hazards of chemicals they use and follow prudent practices for safely handling, storing and disposing of chemicals.

1) Know the hazards and precautions for protection before using any chemical.
2) Review the Hazards Identification Section (section 3) of the SDS and/or King County's School Chemicals List before using any chemical substance.
3) Be prepared to clean up and dispose of chemical spills quickly and correctly.
4) Be prepared to collect and dispose of "used chemicals" as soon as a laboratory procedure is complete.
5) Return all chemicals to their proper storage location as soon as possible.
6) Maintain an accurate chemical inventory through annual updates.
7) Label all chemicals and solutions with the chemical name and primary hazards.
8) Solutions made in the laboratory shall include solution name, concentration and the primary hazard. Documentation of constituents of unknown solutions shall be maintained.
9) Hazardous chemicals must be properly disposed.

Procurement

Prior to purchasing new chemicals, review this checklist:

1) Is the chemical needed for the coming year's curriculum?
2) Do other teachers have excess amounts they could share with you?
3) Is the chemical appropriate for the grade level being taught?
4) How much of this compound shall be used in two years?

Science chemicals must not pose excessive risks to students, staff or the environment. Chemicals listed in **Appendix B – Lake Stevens School District Banned Lab Chemicals List** are prohibited from being purchased for use in the District. If you believe a chemical should not be on that list, contact the District Risk Manager and District Safety Specialist and state the reasons you believe the chemical's hazard rating should be changed.

Having an up-to-date inventory is a critical component of chemical procurement. Prior to purchasing new chemicals, check the inventory to make sure there aren't other bottles on site. (See **Chemical Inventory** for details.) Only purchase chemicals that are appropriate for the school's grade level. (**See Appendix B – Grade Level Appropriate Chemicals.**) For chemicals not found on the list, the District Risk Manager will provide guidelines for evaluating their acceptability.

Always attempt to purchase no more than a two-year supply of new chemicals. This creates safer, less-cluttered storage areas and reduces the risk of chemicals and containers degrading over time.

Open shipping containers and packaging holding chemicals promptly to be sure the contents are in good condition.

Chemical Storage

Store chemicals in designated rooms or cabinets that are secure, well-organized, well-ventilated and uncluttered. Monitor the chemical storeroom monthly to ensure chemical containers are intact, separated into compatible families and their contents are in good condition. Follow these guidelines for safe chemical storage:

1) Areas containing hazardous chemicals shall remain secured at all times. They are off limits to students and other unauthorized personnel. If rooms are unlocked, chemicals must be stored in locked cabinets when not in use.
2) Chemical storage areas shall be well identified with proper signage.
3) Shelves and cabinets shall be signed to show their compatible chemical families.
4) The storage room shall be ventilated by at least ten changes of air per hour. The chemical storage exhaust shall be isolated from the general ventilation system to prevent intake into the building.
5) Properly store chemical containers in their compatible chemical families shown in **Appendix D – Compatible Chemical Storage Chart.**
6) Concentrated inorganic acids (over 5 molar) must be stored in designated acid storage cabinets with secondary containment trays. Containers holding concentrated nitric acid must be stored in a separate secondary container within the acid cabinet or in a separate acid cabinet.
7) Concentrated hydroxide liquids (over 5 molar) must be stored in a designated cupboard or cabinet with securely closing doors and secondary containment trays.
8) Combustible liquids must be stored in flammables storage cabinets with secondary containment that meet International Fire Code standards. Glacial acetic acid must be stored in the Flammables Storage Cabinet.

9) Formal inspections of storage areas will occur annually with documented records kept and made readily accessible to staff. Informal inspections will take place monthly during the school year to ensure safety and compliance to storage procedures.
10) Chemicals are stored on shelves with lips or secondary containment to prevent containers from rolling off. Shelving sections shall be secured to walls or floors to prevent tipping of entire sections.
11) Avoid storing chemicals on shelves above average eye level of staff.
12) Store chemicals away from sinks, electrical outlets and heat sources.
13) Chemicals shall not be stored on the floor, in fume hoods or on lab carts overnight.
14) **Properly label all chemical containers** with the compound's name, its primary hazard (corrosive, flammable, toxic, oxidizer), and the chemical's Storage Code (I-2, O-1, etc.)
15) Laboratory refrigerators are dedicated for non-flammable chemicals, samples and tissue storage only. Edible food will not be stored in a laboratory refrigerator.

Conducting Chemical Inventories

1) See **Appendix F – Conducting an Initial Inventory** for a step-by-step process for creating an initial chemical inventory.
2) A complete electronic chemical inventory must be kept at each school. At a minimum, the inventory must list the chemical's name, the size of the container(s) or approximate amount of chemical on hand.
3) Update the chemical inventory at least annually.
4) During the inventory, note the condition of the containers and their contents. Any degraded materials should be set aside for proper disposal and replaced if needed.
5) Any unneeded or chemicals/solutions beyond reasonable and safe opening dates shall be discarded following district, state and federal regulations.
6) Avoid maintaining no more than a two-year supply of any one chemical compound. Older excess chemicals should be properly disposed.
7) An electronic copy of the updated chemical inventory shall be provided to the building principal and the District Safety Specialist each year.
8) When new chemicals come on site, make sure they are incorporated into the chemical inventory.
9) When chemical containers have been emptied, place them in a "Restock Box" in the lab. Only update the inventory if the containers will not be replaced or are being replaced by different amounts.

SECTION 3 – CHEMICAL HANDLING & SPILL RESPONSE

Personal Hygiene Requirements

All students and staff working with hazardous chemicals must comply with these personal hygiene standards to reduce the risk of chemical contamination and injury.

1) Washing

a) Thoroughly wash skin exposed to chemicals immediately.
b) Wash hands before leaving any room where chemicals are present and in use.

2) **Inhaling chemicals**
   a) Directly inhaling chemicals to detect their odor or for other purposes is forbidden.
3) **Drinking and Eating Restrictions**
   a) Drinking from lab glassware or other lab vessels is forbidden.
   b) Food items for consumption are prohibited from laboratories where chemicals have been used. Neither students nor staff may eat or drink in laboratories.
   c) Food items used in laboratory experiments must be clearly marked with the words "Non-Edible" and stored separately from consumable food items.
4) **Refrigerator**
   a) Never store food in a laboratory refrigerator that has been used to store chemicals.
   b) Laboratory refrigerators may not hold flammable liquids overnight, such as alcohol, unless they are UL rated and signed as "Explosion-Proof."
   c) Refrigerators holding chemicals or biology lab materials must be signed with the words "No Food or Drink." Refrigerators holding edible food must be marked "Food and Drink Only."
5) **Cosmetics**
   a) Cosmetics, including lip balm, will not be applied in a laboratory.
6) **Contacts**
   a) Contacts may be worn by staff and students. If chemicals or their vapors contact the eye, contacts shall be removed <u>while</u> flushing eyes in the eye wash, not before flushing.
7) **Required Apparel when Working with Chemicals**
   a) Shoes shall be low-healed and closed-toed. Socks shall be worn in laboratories when chemicals are present.
   b) Long pants and/or chemical splash aprons shall be worn. Shorts and short skirts are prohibited.
   c) Sleeves must be buttoned or rolled up. Loose sleeves can contact chemicals.
   d) Neckwear such as ties and scarves are prohibited near chemicals.
   e) Long hair must be tied back or otherwise secured to prevent contact with chemicals.
   f) Watches with absorbent wrist bands are prohibited near chemicals.

Prudent Chemical Handling Practices

Many laboratory chemicals possess hazardous characteristics that require special care in their vicinity. Follow these safety guidelines to maintain safe working and learning environments around chemicals.

1) Corrosive Liquids
   a) Chemical-resistant gloves, chemical splash goggles, lab coats and splash aprons must be worn whenever working with **concentrated** liquid acids and bases.
   b) Fume hoods must be used whenever creating basic solutions from dry hydroxides.
   c) Spill kits containing neutralizing materials must be readily available when working with acids and bases.

d) Pathways to eye washes and deluge safety showers should always be clear from obstructions prior to working with acids and bases. Verify pathways are clear and make sure everyone is aware of procedures to flush corrosive liquids off skin immediately.
e) Solutions containing corrosive liquids must be neutralized to a pH between 6.0 and 9.0 prior to disposal to the sanitary sewer.

2) Flammable Liquids

a) Chemical-resistant gloves, chemical splash goggles and lab coats must be worn when working with flammable liquids.
b) Fume hoods and funnels must be used when pouring flammable liquids into secondary containers.
c) Keep flammable liquid containers away from ignition sources, especially when dispensing from them. Ignition sources include flames, heaters, electrical outlets and electrical apparatus that are not rated and labeled as explosion proof.
d) Spill kits containing absorbent materials must be readily available when working with flammable liquids.
e) Clear pathways to eye washes and deluge safety showers prior to working with flammable liquids. Make sure everyone is aware of procedures to flush flammable liquids off skin immediately.
f) Have fire blankets and fire extinguishers readily available prior to working with flammable liquids. Make sure everyone is knowledgeable of first response procedures for laboratory fires prior to working with flammable liquids.
g) When containers of flammable liquids have been emptied, refill the containers with water in the fume hood to purge flammable vapors prior to disposal. Once purged, discharge the water to the sanitary sewer. The bottle can be disposed of as solid waste.

3) Water-reactive and Flammable Solids

a) Water-reactive solids such as sodium metal and potassium metal shall be stored under dry oil (e.g., mineral oil).
b) Water-reactive solids (sodium, potassium, lithium, etc.) shall only be used in the smallest amount sufficient to provide the desired effect.
c) Containers of calcium carbide shall be inspected annually to ensure they've not become moistened and generated flammable acetylene gas.
d) Flammable solids shall be stored on the dry chemical shelves away from oxidizers and liquids.
e) Do not store water-reactive compounds or flammable solids in the flammables storage cabinet.

4) Finely Divided (dust-like) Materials

a) Finely divided (dust-like) materials, such as lycopodium spores, metal dusts, iron oxide, etc., must be handled with care to avoid forming explosive mixtures with air.
b) Keep these fine powders away from ignition sources such as flames or oxidizers.
c) To reduce the risk of inhaling toxic compounds, only open containers of heavy metal and other powders in the chemical fume hood.

5) Toxic Inhalation and Skin Absorption Hazards

a) Toxic compounds that readily absorb through the skin or release volatile vapors must be used in the fume hood.
b) This includes some organic solvents. Always check the safety data sheets for organic solvents to see if they pose risks on contact with skin or when inhaled prior to first use.

6) **Oxidizing Compounds**
   a) Oxidizing compounds can create a fire hazard in contact with flammable liquids and other combustible materials.
   b) Keep oxidizers separated from flammable liquids, flammable solids and other organic materials during storage and use to reduce risks of chemical reactions.

Personal Protective Equipment (PPE)

Many laboratory chemicals possess hazardous characteristics that require special care in their vicinity. Follow these safety guidelines to maintain safe working and learning environments around chemicals.

All staff members working with chemicals and potentially hazardous materials shall use protective safety equipment to reduce potential chemical, high temperature and flash exposures. It is their responsibility to check that the equipment is present and in operational order. All staff working with chemicals, flammables and potentially hazardous materials shall:

- Know the locations of all PPE.
- Know how to use each appropriately.
- Make sure all PPE is clean and in operational order.

1) **Eye Protection**
   a) Laboratory students and staff shall be provided with appropriate eye safety protection and a means to clean the safety eyewear between uses. Defective safety eyewear shall be removed from use and replaced.
   b) Appropriate safety eyewear shall be worn at all times when working with chemicals, glassware, biological specimens and when heat is used in the laboratory.
   c) Safety eyewear shall meet the ANSI Z87.1 standard and fit over eyeglasses securely.
   d) Work sites and laboratories shall clean and disinfect safety eyewear after each use to reduce the spread of eye disease (e.g., via sterilizing cabinets or processes, disinfectant solutions or sprays or soaking in a soap solution maintained at 120°F for 10 minutes).
   e) Whenever chemical splash goggles alone will not provide sufficient protection, additional protection must be used. This can either be provided by wearing a face shield over chemical goggles or several portable safety shields for highly exothermic reactions.
2) **Gloves**
   a) Wear gloves which offer protection for the specific hazards you may find in the lab.
   b) For example, acetone permeates through nitrile and vinyl gloves quickly. If acetone comes in contact with nitrile gloves, immediately discard them and wash the potentially exposed area. Neoprene gloves provide good protection against acetone.
   c) Check specific chemical resistance of gloves in the Ansell Chemical Resistance Guide http://www.ansellpro.com/download/Ansell 8thEditionChemicalResistanceGuide.pdf
   d) Inspect all gloves prior to use/reuse. Discard any that are discolored, punctured, torn or otherwise degraded.
   e) Avoid reusing gloves unless you are sure no hazard is presented by doing so. Disposable nitrile gloves should be disposed after each use, when contaminated, punctured, torn, or otherwise degraded or when their integrity is in question.

f) Gloves must be worn during dissection of preserved biological specimens and are recommended for handling other biological specimens.
g) Latex gloves are no longer to be used in the classroom. Disposable nitrile gloves are the recommended alternative.

3) Aprons and Lab Coats

a) Staff and students shall wear a full-length lab coat when working with chemicals.
b) Chemical-resistant aprons must be worn over the lab coat when working with flammable or corrosive liquids or when conducting biological dissections.

4) Ear Protection

a) Ear protection shall be provided when staff is exposed to sound hazards.

Spill and Accident Procedures

Staff working with chemicals, flammables and potentially hazardous materials shall understand and use the District's spill and accident procedures. All staff shall take prudent and reasonable steps to prevent accidents and spills. Staff shall take measures to prevent spills, make sure safety equipment is available to contain and control the spill and know how to use personal protective and safety equipment.

1) Spill Prevention

a) Design experiments and investigations to minimize the possibility of chemical spills.
b) Buy smaller-size containers or prediluted solutions of higher-hazard compounds.
c) Use the minimum amount of chemicals whenever possible.
d) Use low molarity solutions when working with hazardous materials.
e) Store and dispense chemicals in unbreakable bottles if possible.
f) Use secondary containment trays to prevent spills and leaks from traveling far.
g) Use carts to transport chemicals from the stockroom to the classroom and back.

2) Getting Prepared for Potential Spills

a) Staff shall take measures to prevent spills, make sure safety equipment is available to contain and control the spill and know how to use personal protective and safety equipment. Some prudent prevention measures are:
b) Ensure safety equipment is working properly (e.g., eyewash, safety shower, fire extinguisher, etc.).
c) Have SDSs for the chemicals readily available in a nearby location where they are stored (but outside the stockroom).
d) Have chemical spill control materials available, such as:
    i) Acid-absorbent pads or sodium carbonate in 2.5 gallon sliding-lock plastic bags.
    ii) Base-absorbent pads or citric acid in 2.5 gallon sliding-lock plastic bags.
    iii) Solvent-absorbent pillow or granular absorbent in 2.5 gallon Zip Lock type plastic bag.
    iv) At least one pair of 13" long nitrile gloves, sized to fit instructors.
    v) Five-gallon plastic bucket with lid.
    vi) Four large sturdy plastic trash bags and two one-gallon freezer strength sliding-lock type bags (to double wrap materials).
    vii) Universal warning labels and a sharpie marker in a small sliding-lock type bag.
    viii) Duct tape.

ix) Plastic dustpan with squeegee edge.
x) Foxtail (fat counter brush type).
xi) Fire Blanket - 100 % wool.
xii) Sand.
xiii) Absorbent (kitty litter) in a bucket.
xiv) Boots or waterproof galoshes.

3) Identifying Complex Spills and Chemical Emergencies

a) If you have a spill and the spill is uncontained and endangering other people and/or has the immediate potential to cause a fire, pull the nearest fire alarm to evacuate the building and alert the local fire department. The fire alarm is the fastest way to evacuate the building and get help.
b) If the chemical spill endangers other people outside your workspace or might cause a fire, pull the nearest fire alarm to initiate evacuation and call the local fire department. Call 911 as soon as you are safe to let emergency personnel know what happened. Stay available to help emergency personnel.
c) If the spill caused serious injury or exposure, call 911 from any phone or location.
d) For chemical exposure, use the eye wash or safety shower for 15 minutes, removing all clothing that is contaminated with the chemical.

4) The most common types of spills that cannot be cleaned up by laboratory staff are those that fill the laboratory with toxic vapors. You cannot clean up these spills yourself.

5) Identifying Simple Spills

a) You can clean up the spill yourself if you can answer yes to these four questions:
   - Do you know which chemical was spilled?
   - Do you know the hazards of that chemical?
   - Can you protect yourself from those hazards (with gloves, eye protection, etc.)?
   - Do you have access to, and know how to use, a chemical spill kit for that chemical?

b) If you answer "No" to any of those questions, treat it as a complex spill.

6) Responding to Minor Spills

a) Perform first aid to the injured and/or begin the decontamination process for contaminated students.
b) Isolate the area to keep others from coming in contact with the spilled material. This can be done at the same time as an evacuation is ordered.
c) Notify another staff person that you will be cleaning up the spill. Have that person keep the area secure and monitor your progress.
d) Identify the hazard (use a SDS) and plan the appropriate response.
e) Don appropriate PPE (chemical gloves, chemical splash goggles, boots, aprons, etc.).
f) Ventilate the area (open windows and doors, turn on purge fan).
g) Contain spilled liquids by pouring sand around and on the spill.
h) Pour kitty litter on it and stir it in.
i) Apply the appropriate neutralizer/absorbent around and onto the spill. Stir it in.
j) Once neutralized/absorbed, clean up the spill with a plastic/metal dustpan and broom and place it in a large plastic bag.
k) Properly dispose of the hazardous waste per procedures.

7) Fill out a Detailed Report

a) Once the emergency is over, complete a short report describing the accident and your response. Photograph the area if possible. Forward a complete copy of the report and all incident materials to the building principal and the District Safety Specialist.

Treatment and Disposal of Chemical Wastes

All disposal procedures shall conform to state and local regulations. Four common types of hazardous wastes are generated by school laboratories:

- Corrosive acidic and basic solutions.
- Aqueous solutions containing metal salts.
- Used alcohols and other flammable liquids.
- Discarded chemical products.

Each of these waste streams is processed in specific ways to protect human health and the environment. The procedures listed below must be followed for each type of waste. When questions arise about proper methods, contact the District Safety Specialist for guidance.

1) Corrosive Acid and Base Wastes

a) Over 100 milliliters of concentrated acids and bases (over 5 molar) must be disposed as hazardous waste.
b) Smaller volumes of concentrated acids and bases or prediluted acid and base wastes that do not contain toxic heavy metals may be neutralized prior to disposal to the sanitary sewer.
c) Prior to treating corrosive wastes, put on a lab coat, splash apron, closed-toed shoes, chemical-resistant gloves, chemical splash goggles and a face shield. Ensure the area is well ventilated.
d) Neutralization activities fall under the Treatment by Generator Requirements. Therefore, a log sheet listing the type of acid or base, the amount being treated, the date and the initials of the person doing the treatment must be filled out every time waste is neutralized.
e) Neutralize acids in a sink or tub containing cold water. Slowly add the acid to the water while stirring. Then slowly add either sodium carbonate or sodium bicarbonate while stirring. Once the pH is between 6.0 and 9.0, the solution can be discharged to the sanitary sewer.
f) Neutralize bases in a sink or tub containing cold water. Slowly add the base to the water while stirring. Then slowly add citric acid while stirring. Once the pH is between 6.0 and 9.0, the solution can be discharged to the sanitary sewer.

2) Aqueous Solutions Containing Metal Salts

a) Place a large beaker or tub inside a secondary containment tray.
b) Line the beaker with a large sliding-lock plastic bag.
c) Pour aqueous metals solutions into the bag and allow them to evaporate.
d) Evaporation activities fall under the Treatment by Generator Requirements. Therefore, a log sheet listing the type and amount of metal solution added to the bag, the date and the initials of the person doing the treatment must be filled out every time waste is added to the bag.
e) Once the bag is getting full of sludge, zip it closed and transfer it to a five-gallon plastic bucket that is labeled “Heavy Metal Sludge – Hazardous Waste”.
f) When the five-gallon bucket gets full, seal the lid closed and dispose of it with a hazardous waste vendor.

g) Place the log sheets that describe the wastes contained by the bucket in a sliding-lock bag and tape it to the lid of the bucket prior to disposal.
h) To arrange for pickup of hazardous waste, contact the District Safety Specialist.

3) Used Alcohols and Other Flammable Liquids

a) Solutions containing over 24 percent alcohol are regulated as ignitable hazardous waste when they're disposed.
b) Where possible, adjust lab exercises so the resulting alcohol wastes are under 25 percent in concentration. Where this is not possible, alcohol wastes must be collected and disposed as ignitable hazardous waste.
c) All other flammable solvent wastes must be disposed as ignitable hazardous waste.
d) To arrange for pickup of hazardous waste, contact the District Safety Specialist.

4) Discarded Chemical Products

a) When old or degraded chemicals are no longer useful, they should be disposed.
b) Make a list of the chemicals needing disposal that includes the chemical's name and the size of the container. Provide this list to District Safety Specialist to arrange for their removal.
c) Put the chemicals in boxes labeled "For Disposal".
d) Keep incompatible chemicals in separate boxes. Separate acids from bases, flammable liquids from oxidizers and acids, and water reactive compounds from all liquids.

5) Biological Specimens

a) Holding solutions for biological specimens that contain Carosafe, Ward-Safe, Flinn-Safe or other liquids that do not contain formalin may be poured down the drain to the sanitary sewer.
b) Used or no longer needed biological specimens may contain residual amounts of formalin, even if they are held in formalin-free holding solutions. These specimens can be disposed as solid waste once they are double-bagged in plastic.
c) If the holding solution in a specimen jar is unidentified, assume it contains formalin and handle it as such.
d) Formalin solutions are toxic hazardous waste. They must be disposed of as hazardous waste.

SECTION 4 – SAFETY

Safety Equipment

Laboratories must be equipped with safety equipment that supports safe laboratory practices. This equipment must be properly installed, tested and maintained at operational levels. Staff and students must be trained in the use of safety equipment to ensure emergency procedures can be quickly put in place when an accident or exposure occurs.

Staff shall take care to ensure safety equipment is in proper working order before performing any laboratory activities.

1) Master controls

a) Each building must have procedures to follow in event of a power failure. Staff members shall know where and how to shut off master controls in case of emergency at their work site. A

schematic map/drawing of the master utility controls shall be kept readily available and accessible at each building site.

b) Post procedures to be followed in the event of a power failure in each laboratory.
c) Staff members shall be trained in the location and use of fire alarms and master utility controls at their worksite.
d) Master utility controls to shut off gas, electrical (including lab bench power) and water supplies shall be clearly signed and readily accessible to staff (e.g. near an exit door).

2) Ventilation

a) Air shall flow directly into laboratories, prep rooms and chemical storerooms from non-laboratory areas and out to the exterior of the building away from air intake ducts.
b) Maintenance will conduct at least annual inspections of laboratory and chemical prep/storeroom ventilation systems. Any deviations from the recommended standard shall be repaired per an established time line.
c) In laboratories and chemical storage rooms, an increased rate of ventilation of 20 cubic feet per minute is required.

3) Eyewash stations

a) Eyewash stations must be provided and operational at each site where chemicals, flammables and potentially hazardous materials exist.
b) An approved eyewash station shall be within 50 feet or 10 seconds of areas where hazardous chemicals are stored or handled.
c) All eye wash stations shall be appropriately plumbed to or above drains that lead to the sanitary sewer system.
d) All laboratories and work sites using chemicals shall have an eye wash capable of hands-free flushing of both eyes continuously for 15 minutes with greater than .4 gallons (1.5 liters) a minute water outflow.
e) Eyewash water shall be potable and at room temperature (60 to 100 degrees F).
f) All staff and students must be trained in proper use of eyewashes.
g) Contacts shall be removed while eyes are being flushed.
h) Eyewashes must be tested weekly to flush the system and help keep it in operational order.

4) Safety Shower Stations

a) Safety showers shall be provided and operational at each site where hazardous chemicals are handled. They must be able to run with a 20 gallon (75 liters) a minute water outflow for 15 minutes in a hands-free operation.
b) Safety showers shall be located 50 feet or 10 seconds from sites where hazardous chemicals and materials are located and used.
c) Any room containing a safety shower shall be clearly marked/labeled on the entry door.
d) It is recommended that a curtain or other temporary screening method be in place for privacy and water containment.
e) It is recommended that a pair of scissors be easily accessible to the safety shower for cutting off clothes that are contaminated with chemicals.

5) Chemical Fume Hoods

a) Fume hoods shall be used for activities which might result in release of toxic chemical vapors or dusts.
b) Chemical reagents shall not be stored for more than one night in the fume hood.

c) Fume hoods shall be kept in operational condition at all times. Fume hood face velocity rates shall be tested biannually and the 100 foot per minute sash height must be clearly marked.
d) Evaporation of aqueous metals solutions for disposal may be done in the fume hood if no other secure location can be found. The evaporation container must be placed in a secondary containment tray to protect against release of spills or leaks. Disposal of these evaporated chemicals/solutions shall follow disposal procedures.
e) Fume hoods must be used when working with corrosive, carcinogenic, flammable or noxious/poisonous chemicals.

6) Other Required Safety Equipment

a) Tri-class fire extinguishers (minimum five pounds) are required in all laboratories and work sites and shall be readily available for minor chemical spills.
b) Chemical spill kits shall be located near areas where chemicals are stored or handled.
c) First aid kits shall be available at each site where chemicals are stored or handled.
d) Fire blankets shall be within 25 feet of chemical storage areas and in each laboratory. Students and staff shall be trained in the "Drop and Roll" technique.
e) Emergency phone numbers shall be clearly posted near the telephone at each site.

Safety Audits

Chemical Hygiene Officers will conduct annual audits of all science spaces. Safety audits provide ongoing training of staff and the reporting and correcting of any discrepancies. The goal is to develop expertise and create the safest possible working environment for staff and students.

The OSPI website, www.k12.wa.us/schfacilities/healthsafetyguide.aspx, has the current ***Health and Safety Guide for K – 12 Schools in Washington.*** It can be downloaded and printed as needed per audit. The following sections can be utilized as a guideline for site audits:

F – Indoor Air Quality.
G – HVAC Preventative Maintenance.
K – Science Classroom Laboratories.
M – Blood borne Pathogens and Exposure Control.
O – Animals in Schools.
P – Emergency and Disaster Preparedness.

Staff at each school will use the Science Classroom and Lab Reference Checklist (Appendix I) when conducting the annual safety audit. Copies of Science Laboratory Audits will be forwarded to the building principal, Chemical Hygiene Officer and District Safety Specialist.

Reporting of Discrepancies

When problems with equipment or safety procedures are found, it is the responsibility of the staff person to immediately notify his/her building supervisor/principal and Chemical Hygiene Officer to resolve how to bring the item of concern back into reasonable and prudent compliance. Any safety equipment failing inspection or reported to be out of order at any time shall be repaired immediately.

Follow district protocol to complete needed repairs, replacement of identified malfunctioning equipment and to implement new procedures to create a safer work environment for students and staff.

Emergency Response/Evacuation Plan

Laboratories and schools will have written and readily accessible emergency/disaster response plans. Each building will maintain a copy of their Emergency Response Plan and its CHP. Students and staff shall know, practice and follow the emergency evacuation and fire notification procedures at their school or work site.

Exposures

It is the communicated policy of the District to investigate all suspected overexposures to chemicals in a prompt and timely fashion. All suspected overexposures to chemical substances shall be reported to the Department Head, Chemical Hygiene Officer, Principal, and District Safety Specialist in a prompt and timely fashion.

In the event of an overexposure, after the immediate response, staff shall document the:
1) Time.
2) Location.
3) Individuals involved.
4) Equipment used.
5) Chemicals used.
6) Circumstances involved in the chemical exposure.

This information is to be used to assist medical treatment, improve our laboratory safety practices and is not for disciplinary proceedings. It is the Lake Stevens School District's obligation to maintain records of chemical exposures and monitoring and make them accessible to staff.

Signs of chemical exposure are numerous. They include but are not limited to:
1) Pain or burning on skin or in eyes, throat or nasal passages.
2) Itching, irritation.
3) Rash or swelling of mucous membranes or skin.
4) Symptoms of illness such as nausea, vomiting or dizziness.
5) Reports of chemical contact to skin or eyes.
6) Reports of breathing in dust particles.

SECTION 5 – TRAINING

Staff and students must be trained in those areas of the CHP that could affect the way they conduct their activities in the District. Chemical Hygiene Officers at each school will receive training on the CHP's components and on the steps needed to conduct a thorough and adequate safety audit each year. Training will include both classroom and hands-on components as necessary.

Training Components

The broad goal of safety training is to be ready to respond to accidents and emergencies with properly trained personnel and functioning equipment. As part of this, staff must be prepared to:

1) Operate laboratory equipment and safety equipment properly.
2) Recognize, correct or report safety hazards.
3) Follow proper chemical ordering, storage, labeling, use, clean up and disposal techniques.
4) Take appropriate action in emergencies, including reporting incidents to 911.
5) Suppress small fires.
6) Follow chemical spill procedures.
7) Avoid electrical shock.
8) Evacuate and isolate laboratory rooms in the event of a major spill.
9) Provide injured students with first aid.
10) Request medical care or monitoring appropriately.
11) Perform safety audits of the science areas.
12) Train all students and other staff on how to:
    a) Follow laboratory safety rules and conduct emergency procedures.
    b) Find and operate all safety emergency equipment (e.g., eyewash station, safety shower, fire extinguishers, fire blankets, chemical spill kits, etc.).
    c) Use, inspect and maintain PPE.
13) Document staff training.

Appendix A – Chemical Hygiene Officer Appointments 2014-2015

The Lake Stevens School District appoints the following personnel as Chemical Hygiene Officers for the 2014-2015 school year.

Lake Stevens High School: Sheryl Aubol

Cavelero Mid High School: Fred VenderWerff

Lake Stevens Middle School: Bill Anderst

North Lake Middle School: Derek Drube

We acknowledge the Chemical Hygiene Officers has the knowledge and authority to implement and enforce the Chemical Hygiene Plan.

Ken Collins
Assistant Superintendent
Lake Stevens School District

Appendix B – Banned Chemicals List

Reference: www.lhwmp.org/educators/chemlist.aspx

Chemical Name	Hazard Rank	Lowest Grade Level Allowed
Acetal	5	Banned
Acetaldehyde	5	Banned
Acetyl Chloride	5	Banned
Acrolein	5	Banned
Acrylamide	5	Banned
Acrylic Acid	5	Banned
Acrylonitrile	5	Banned
Adrenaline	5	Banned
Adrenaline Chloride Solution	5	Banned
Alkaline Iodide Azide	5	Banned
Allyl Chloride	5	Banned
Americium - Metal Lump	5	Banned
Amidol	5	Banned
Aminodiphenyl, 4-	5	Banned
Ammonium Bifluoride	5	Banned
Ammonium Metavanadate	5	Banned
Ammonium Nitrite	5	Banned
Ammonium Perchlorate	5	Banned
Ammonium Polysulfide	5	Banned
Ammonium Sulfide	5	Banned
Anasol	5	Banned
Anhydrous Ammonia	5	Banned
Aniline	5	Banned
Aniline Acetate	5	Banned
Aniline Hydrochloride	5	Banned
Anthracene	5	Banned
Antimony - Powder	5	Banned
Antimony Trichloride	5	Banned
Arsenic - Metal Lump	5	Banned
Arsenic - Powder	5	Banned
Arsenic Trioxide	5	Banned
Arsine	5	Banned
Asbestos	5	Banned
Barium - Metal Lump	5	Banned
Barium - Powder	5	Banned
Barium Chlorate	5	Banned
Barium Chromate	5	Banned
Benzalkonium Chloride	5	Banned

Benzene	5	Banned
Benzidine	5	Banned
Benzoyl Chloride	5	Banned
Benzoyl Peroxide	5	Banned
Beryllium - Powder	5	Banned
Beryllium Hydroxide	5	Banned
Beryllium Oxide	5	Banned
Beryllium Sulfate	5	Banned
Boron Trichloride	5	Banned
Bouin's Fixative	5	Banned
Bromoethane	5	Banned
Butadiene	5	Banned
Cadmium - Powder	5	Banned
Cadmium Acetate	5	Banned
Cadmium Chloride - Anhydrous	5	Banned
Cadmium Chloride - Pentahydrate	5	Banned
Cadmium Iodide	5	Banned
Cadmium Nitrate - Anhydrous	5	Banned
Cadmium Nitrate - Tetrahydrate	5	Banned
Cadmium Oxide	5	Banned
Cadmium Sulfate - Anhydrous	5	Banned
Cadmium Sulfate - Octahydrate	5	Banned
Calcium - Powder	5	Banned
Calcium Cyanide	5	Banned
Calcium Phosphide	5	Banned
Carbon Disulfide	5	Banned
Carbon Monoxide	5	Banned
Carbon Tetrachloride	5	Banned
Carbonyl Sulfide	5	Banned
Carnoy's Fixative	5	Banned
Catechol	5	Banned
Cesium 133	5	Banned
Chloral Hydrate	5	Banned
Chloretone	5	Banned
Chlorine	5	Banned. Purchase prediluted chlorine water instead
Chlorine Trifluoride	5	Banned
Chloroethanol	5	Banned
Chloroform	5	Banned
Chlorophenol	5	Banned
Chloroprene	5	Banned
Chloropromazine	5	Banned
Chlorosulfonic Acid	5	Banned

Cobalt - Powder	5	Banned
Colchicine	5	Banned
Collodion	5	Banned
Cresol	5	Banned
Cumene	5	Banned
Cupric Cyanide	5	Banned
Cuprous Cyanide	5	Banned
Cyanogen Bromide	5	Banned
Dibromo-3-chloropropane, 1,2-	5	Banned
Dichlorobenzidine	5	Banned
Dichlorophenoxy Acetic Acid	5	Banned
Dimethyl Aniline	5	Banned
Dimethylaminoazobenzene, 4-	5	Banned
Dinitrophenol	5	Banned
Dinitrophenyl Hydrazine	5	Banned
Dioxane	5	Banned
Estrone	5	Banned
Ethanolamine	5	Banned
Ethyl Chloride	5	Banned
Ethyl Ether	5	Banned
Ethyl Iodide	5	Banned
Ethyl Nitrate	5	Banned
Ethylene Oxide	5	Banned
Ethylenediamine	5	Banned
Ethyleneimine	5	Banned
Europium - Metal Lump	5	Banned
Formaldehyde	5	Banned
Gilson's Fixative	5	Banned
Glyoxal	5	Banned
Hayem Diluting Fluid	5	Banned
Heavy Metal Glaze	5	Banned
Hexane-based Aerosol	5	Banned
Hydrazine	5	Banned
Hydrazine Sulfate	5	Banned
Hydrofluoric Acid	5	Banned
Hydrogen Bromide	5	Banned
Hydrogen Chloride	5	Banned
Hydrogen Peroxide (>31%)	5	Banned
Hydrogen Sulfide Gas	5	Banned
Immersion Oil - Containing PCBs	5	Banned
Isopropyl Ether	5	Banned
Lanthanum - Metal Lump	5	Banned
Lauroyl Peroxide	5	Banned

Lead - Powder	5	Banned
Lead Arsenate	5	Banned
Lead Chromate	5	Banned
Lead Citrate	5	Banned
Lithium - Powder	5	Banned
Manganese - Powder	5	Banned
Mercaptoethanol	5	Banned
Mercuric Bichloride	5	Banned
Mercuric Chloride	5	Banned
Mercuric Iodide	5	Banned
Mercuric Nitrate - Hydrate	5	Banned
Mercuric Oxide	5	Banned
Mercuric Oxycyanide	5	Banned
Mercuric Sulfate	5	Banned
Mercuric Sulfide	5	Banned
Mercurochrome	5	Banned
Mercurous Chloride	5	Banned
Mercurous Nitrate - Anhydrous	5	Banned
Mercurous Nitrate - Hydrate	5	Banned
Mercurous Sulfate	5	Banned
Mercury Compounds	5	Banned
Mercury Thermometers	5	Banned
Methoxyethanol	5	Banned
Methyl Bromide	5	Banned
Methyl Chloromethyl Ether	5	Banned
Methyl Ethyl Ketone Peroxide	5	Banned
Methyl Iodide	5	Banned
Methyl Isobutyl Ketone	5	Banned
Methyl Isocyanate	5	Banned
Methyl Mercaptan	5	Banned
Methyl Tert-Butyl Ether	5	Banned
Methylamine	5	Banned
Millon's Reagent	5	Banned
Naphthylamine	5	Banned
Nessler's Reagent	5	Banned
Nicotine	5	Banned
Nitrobenzene	5	Banned
Nitroglycerin	5	Banned
Nitrosodimethylamine, N-	5	Banned
Osmium Tetroxide	5	Banned
Paraformaldehyde	5	Banned
Paraldehyde	5	Banned
Paris Green	5	Banned

Pentachlorophenol	5	Banned
Perchloric Acid	5	Banned
Phenylarsine Oxide - Solid	5	Banned
Phenylthiocarbamide	5	Banned
Phosphorus - Red	5	Banned
Phosphorus - White	5	Banned
Phosphorus - Yellow	5	Banned
Phosphorus Pentasulfide	5	Banned
Phosphorus Pentoxide	5	Banned
Phosphorus Trichloride	5	Banned
Physostigmine	5	Banned
Picric Acid	5	Banned
Potassium - Chunks	5	Banned
Potassium Cyanide	5	Banned
Potassium Peroxide	5	Banned
Praseodymium - Metal Lump	5	Banned
Promethium - Metal Lump	5	Banned
Pyridine	5	Banned
Radium - Metal Lump	5	Banned
Rubidium - Metal Lump	5	Banned
Selenium - Metal Lump	5	Banned
Selenium - Powder	5	Banned
Silicon Tetrafluoride	5	Banned
Silver Cyanide	5	Banned
Sodium - Chunks	5	Banned
Sodium Arsenate	5	Banned
Sodium Arsenite	5	Banned
Sodium Azide	5	Banned
Sodium Borohydride	5	Banned
Sodium Cyanide	5	Banned
Sodium Dithionite	5	Banned
Sodium Fluoroacetate	5	Banned
Sodium Nitroferricyanide	5	Banned
Strychnine	5	Banned
Sulfur Dioxide	5	Banned
Testosterone	5	Banned
Testosterone Propionate	5	Banned
Tetrabromoethane	5	Banned
Tetrafluoroethylene	5	Banned
Tetrahydrofuran	5	Banned
Thallium - Metal Lump	5	Banned
Thimerosol	5	Banned
Thionyl Chloride	5	Banned

Thorium Nitrate	5	Banned
Thorium Oxide	5	Banned
Titanium Tetrachloride	5	Banned
Titanium Trichloride	5	Banned
Tollen's Reagent	5	Banned
Trichloroethane	5	Banned
Trichloroethylene	5	Banned
Trichlorotrifluoroethane	5	Banned
Triethyl Phosphate	5	Banned
Trinitrobenzene	5	Banned
Trinitrotoluene	5	Banned
Uranium	5	Banned
Uranyl Acetate	5	Banned
Uranyl Nitrate	5	Banned
Vanadium - Metal Lump	5	Banned
Vanadium Pentoxide	5	Banned
Vanadyl Trichloride	5	Banned
Vinyl Chloride	5	Banned
Vinyl Ether	5	Banned
Zenker's Fixative	5	Banned

Appendix C –Grade Level Appropriate Chemicals

Reference: www.lhwmp.org/educators/chemlist.aspx

Chemical Name	Hazard Rank	Lowest Grade Level Allowed	Storage Location
Acetanilide	3	High School	O-2
Acetic Acid (<1 Molar)	0	All Grades	I-1
Acetic Acid (>6 Molar)	3	High School	O-1 Flam Cabinet
Acetic Acid (1 Molar to 6 Molar)	2	Middle School	O-1
Acetic Anhydride	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 milliliters.	O-1 Flam Cabinet
Aceto Carmine	2	Middle School	O-9
Acetone	2	Middle School	O-4 Flam Cabinet
Acetonitrile	4	High School w/ Chemical Hygiene Officer approval	O-7 Flam Cabinet
Aceto-Orcein Solution	3	High School	O-1
Acetylcholine Bromide	2	Middle School	O-9
Acetylcholine Bromide Solution	2	Middle School	O-9
Acetylcholine Chloride	2	Middle School	O-9
Acetylcholine Chloride Solution	2	Middle School	O-9
Acetylene	4	Purchase restricted to use in welding shop.	Gas - Flammable
Acetylsalicylic Acid	2	Middle School	O-1
Acridine Orange	2	Middle School	O-9
Adenine	3	High School	O-2
Adenosine Triphosphate	3	High School	O-2
Adipic Acid	2	Middle School	O-1
Adipoyl Chloride	3	High School	O-1
Adipoyl Chloride - Hexane Solution	3	High School	O-3 Flam Cabinet
Agar	1	Elementary demos only	Misc
Agarose	1	Elementary demos only	Misc
Aitch-tu-ess Cartridges	3	High School	I-5 Flam Cabinet
Alanine, DL-	2	Middle School	O-1
Alanine, L-	2	Middle School	O-1
Albumin	1	Elementary demos only	O-2
Alconox	2	Middle School	Sink area
Alizarin	2	Middle School	O-9
Alizarin Red S	2	Middle School	O-9
Alizarin Yellow R	2	Middle School	O-9
Alkaline Potassium Iodide	2	Middle School	I-4 Base Cabinet
Aluminon	2	Middle School	O-1
Aluminum - Metal Lump	0	All Grades	Misc

Aluminum - Powder	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams	I-1
Aluminum Ammonium Sulfate	2	Middle School	I-2
Aluminum Chloride - Anhydrous	4	High school w/ Chemical Hygiene Officer approval	I-2
Aluminum Chloride - Hexahydrate	3	High School	I-2
Aluminum Hydroxide	2	Middle School	I-4 Base Cabinet
Aluminum Nitrate - Anhydrous	2	Middle School	I-3
Aluminum Nitrate - Nonahydrate	2	Middle School	I-3
Aluminum Oxide	2	Middle School	I-4
Aluminum Potassium Sulfate	2	Middle School	I-2
Aluminum Sodium Sulfate	2	Middle School	I-2
Aluminum Sulfate - 18 hydrate	2	Middle School	I-2
Aluminum Sulfate - Anhydrous	2	Middle School	I-2
Ammonium Acetate	2	Middle School	I-2
Ammonium Bicarbonate	2	Middle School	I-4
Ammonium Bromide	2	Middle School	I-2
Ammonium Carbonate	2	Middle School	I-4
Ammonium Chloride	2	Middle School	I-2
Ammonium Chromate	3	High School	I-8
Ammonium Citrate	2	Middle School	I-2
Ammonium Dichromate	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-8
Ammonium Fluoride	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 25 grams.	I-2
Ammonium Hydroxide (<1 Molar)	2	Middle School	I-4
Ammonium Hydroxide (>6 Molar)	3	High School	I-4 Base Cabinet
Ammonium Hydroxide (1 Molar to 6 Molar)	2	Middle School	I-4 Base Cabinet
Ammonium Iodide	2	Middle School	I-2
Ammonium Molybdate	2	Middle School	I-8
Ammonium Nitrate	3	High School or Middle School w/ Chemical Hygiene Officer approval. Storage limit: 500 grams.	I-3 Separate
Ammonium Oxalate - Anhydrous	3	High School	I-2
Ammonium Oxalate - Monohydrate	3	High School	I-2
Ammonium Persulfate	3	High School	I-6
Ammonium Phosphate - Dibasic	2	Middle School	I-2
Ammonium Phosphate - Monobasic	2	Middle School	I-2
Ammonium Sulfate	2	Middle School	I-2
Ammonium Tartrate	2	Middle School	I-2
Ammonium Thiocyanate	2	Middle School	I-7
Amyl Acetate	3	High School	O-3 Flam Cabinet
Amylase	2	Middle School	O-2
Aniline Blue	2	Middle School	O-9
Anthranilic Acid	2	Middle School	O-1
Anthrone	3	High School	O-3
Antimony - Metal Lump	2	Middle School	I-1

Antimony Potassium Tartrate	2	Middle School	I-2
Arabinose	2	Middle School	O-2
Arginine	2	Middle School	O-9
Argon	3	High School	Gas cylinders
Ascarite	3	High School	I-4
Ascorbic Acid	0	All Grades	I-1
Asparagine	2	Middle School	O-1
Aspartic Acid	2	Middle School	O-1
Barfoed Reagent	2	Middle School	O-1
Barium Acetate	4	High School w/ Chemical Hygiene Officer approval	I-2
Barium Carbonate	3	High School	I-4
Barium Chloride	2	Middle School	I-2
Barium Hydroxide	3	High School	I-4
Barium Nitrate	3	High School	I-3
Barium Peroxide	4	High School w/ Chemical Hygiene Officer approval	I-6
Barium Sulfate	2	Middle School	I-2
Benedict's Reagent	2	Middle School	I-2
Benzaldehyde	3	High School	O-3 Flam Cabinet
Benzoic Acid	2	Middle School	O-1
Benzoin	3	High School	O-4
Benzonitrile	4	High School w/ Chemical Hygiene Officer approval	O-7 Flam Cabinet
Benzophenone	3	High School	O-4
Benzyl Alcohol	3	High School	O-2 Flam Cabinet
Benzylaminopurine	3	High School	O-9
Beryllium - Metal Lump	4	High School w/ Chemical Hygiene Officer approval	I-1
Bile Salts	2	Middle School	O-1
Bismarck Brown Y	2	Middle School	O-9
Bismuth - Metal Lump	2	Middle School	I-1
Bismuth - Powder	4	High School w/ Chemical Hygiene Officer approval	I-1
Bismuth Nitrate	2	Middle School	I-3
Bismuth Subnitrate	2	Middle School	I-3
Bismuth Trichloride	3	High School	I-2
Biuret	2	Middle School	O-2
Biuret Reagent	2	Middle School	I-4 Base Cabinet
Boric Acid	2	Middle School	I-9
Boron - Metal Lump	2	Middle School	I-1
Brilliant Cresyl Blue	3	High School	O-9
Brilliant Green	3	High School	O-9
Bromine	4	High School w/ Chemical Hygiene Officer approval. Purchase as bromine water. Storage limit for concentrate: 10 grams.	I-2 Acid Cabinet

Bromine Water	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 500 mls.	I-2 Acid Cabinet
Bromobenzene	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 milliliters	O-4 Flam Cabinet
Bromobutane	4	High School w/ Chemical Hygiene Officer approval	O-4 Flam Cabinet
Bromocresol Green	2	Middle School	O-9
Bromocresol Purple	2	Middle School	O-9
Bromoform	4	High School w/ Chemical Hygiene Officer approval	O-4
Bromphenol Blue	2	Middle School	O-9
Bromthymol Blue	2	Middle School	O-9
Butanol, 1-	3	High School	O-2 Flam Cabinet
Butanol, 2-	3	High School	O-2 Flam Cabinet
Butoxyethanol	3	High School	O-2 Flam Cabinet
Butyl Acetate	3	High School	O-3 Flam Cabinet
Butyl Stearate	3	High School	O-3
Butylated Hydroxytoluene	2	Middle School	O-8
Butyraldehyde	4	High School w/ Chemical Hygiene Officer approval	O-3 Flam Cabinet
Butyric Acid	3	High School w/ Chemical Hygiene Officer approval. Storage limit: 50 milliliters.	O-1 Flam Cabinet
Cadmium - Metal Lump	3	High School	I-1
Caffeine	3	High School	O-2
Calcium - Metal Lump	3	High School	I-1
Calcium Acetate	2	Middle School	I-2
Calcium Bromide	2	Middle School	I-2
Calcium Carbide	3	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-5
Calcium Carbonate	2	Middle School	I-4
Calcium Chloride	2	Middle School	I-2
Calcium Chloride	2	Middle School	I-2
Calcium Fluoride	3	High School	I-2
Calcium Gluconate	2	Middle School	Misc
Calcium Hydroxide	2	Middle School	I-4
Calcium Hypochlorite	3	High School	I-6
Calcium Iodide	2	Middle School	I-2
Calcium Nitrate - Anhydrous	3	High School	I-3
Calcium Nitrate - Hydrate	2	Middle School	I-3
Calcium Oxide	2	Middle School	I-4
Calcium Phosphate, Dibasic	2	Middle School	I-2
Calcium Phosphate, Monobasic	2	Middle School	I-2
Calcium Phosphate, Tribasic	2	Middle School	I-2
Calcium Sulfate - Dihydrate	0	All Grades	O-1
Calcium Sulfate - Hemihydrate	0	All Grades	I-2
Calcium Sulfide	4	High School w/ Chemical Hygiene Officer approval	I-5

Calmagite	2	Middle School	Misc
Camphor	4	High School w/ Chemical Hygiene Officer approval	O-4
Canadian Balsam	2	Middle School	Misc
Canadian Balsam in Xylene	2	Middle School	O-3 Flam Cabinet
Carbol Fuchsin	3	High School	O-8 Flam Cabinet
Carbon	2	Middle School	I-4
Carbon Black	2	Middle School	I-4
Carbon Dioxide	2	Middle School	Gas - Non Flam
Carmine	2	Middle School	O-9
Carnauba Wax	0	All Grades	I-2
Casein	2	Middle School	Misc
Catalase	2	Middle School	Misc
Cedarwood Oil	2	Middle School	O-3
Cellulose	1	Elementary demos only	Misc
Cerium - Metal Lump	2	Middle School	I-1
Cerium Ammonium Nitrate	3	High School	I-3
Cesium Chloride	2	Middle School	I-2
Cetyl Alcohol	2	Middle School	O-2
Charcoal	2	Middle School	I-4
Chlorine Water	3	High School	I-2 Acid Cabinet
Chlorobenzene	3	High School	O-4 Flam Cabinet
Chlorophenol Red	2	Middle School	O-9
Chlorophyllin	2	Middle School	O-9
Cholesterol	2	Middle School	Misc
Chromatography Solvent	2	Middle School	O-2 Flam Cabinet
Chromic Acid	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 mls.	I-8 Acid Cabinet
Chromium - Metal Lump	2	Middle School	I-1
Chromium - Powder	4	High School w/ Chemical Hygiene Officer approval	I-1
Chromium Chloride - Anhydrous	2	Middle School	I-2
Chromium Chloride - Hydrate	2	Middle School	I-2
Chromium Nitrate	2	Middle School	I-3
Chromium Oxide	2	Middle School	I-4
Chromium Potassium Sulfate - Anhydrous	2	Middle School	I-2
Chromium Potassium Sulfate - Dodecahydrate	2	Middle School	I-2
Chromium Sulfate	2	Middle School	I-2
Chromium Trioxide	4	High School w/ Chemical Hygiene Officer approval	I-4
Chy-Max	0	All Grades	Misc
Cinnamaldehyde	3	High School	O-3
Citric Acid	2	Middle School	O-1
Clayton Yellow	2	Middle School	O-9

Clove Oil	3	High School	O-8
Cobalt - Metal Lump	2	Middle School	I-1
Cobalt Carbonate	2	Middle School	I-4
Cobalt Chloride - Anhydrous	3	High School	I-2
Cobalt Chloride - Hydrate	3	High School	I-2
Cobalt Nitrate - Anhydrous	3	High School	I-3
Cobalt Nitrate - Hydrate	2	Middle School	I-3
Cobalt Oxide	3	High School	I-4
Cobalt Sulfate	2	Middle School	I-2
Congo Red	3	High School	O-9
Copper - Metal Lump	0	All Grades	Misc
Copper - Powder	3	High School	I-1
Copper Acetate - Anhydrous	3	High School	I-2
Copper Acetate - Hydrate	2	Middle School	I-2
Copper Bromide	2	Middle School	I-2
Copper Carbonate	2	Middle School	I-4
Copper Chloride - Anhydrous	3	High School	I-2
Copper Chloride - Dihydrate	2	Middle School	I-2
Copper Hydroxide	2	Middle School	I-4
Copper Nitrate - Anhydrous	3	High School	I-3
Copper Nitrate - Hemipentahydrate	2	Middle School	I-3
Copper Nitrate - Trihydrate	2	Middle School	I-3
Copper Sulfate	2	Middle School	I-2
Creatine	2	Middle School	O-1
Creatinine	2	Middle School	O-9
Creosote	4	High School w/ Chemical Hygiene Officer approval	O-8 Flam Cabinet
Cresol Purple	2	Middle School	O-9
Cresol Red	2	Middle School	O-9
Cresol Red, Sodium Salt	2	Middle School	O-9
Crystal Violet	2	Middle School	O-9
Cupric Oxide	2	Middle School	I-4
Cupric Sulfide	3	High School	I-5
Cuprous Acetate	2	Middle School	I-2
Cuprous Chloride	2	Middle School	I-2
Cuprous Oxide	2	Middle School	I-4
Cuprous Sulphide	3	High School	I-5
Cyclohexane	3	High School	O-3 Flam Cabinet
Cyclohexanol	3	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 mls.	O-2 Flam Cabinet
Cyclohexanone	3	High School	O-4 Flam Cabinet
Cyclohexene	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 mls.	O-3 Flam Cabinet
Cysteine	2	Middle School	O-1
Decanoic Acid	3	High School	O-1
Denatured Alcohol	3	High School	O-2 Flam Cabinet
Deuterium Oxide	2	Middle School	Misc

Dextrin	2	Middle School	Misc
Dextrose	1	Elementary demos only	O-2
Diastase of Malt	2	Middle School	O-2
Diatomaceous Earth	2	Middle School	Misc
Dibutyl Phthalate	4	High School w/ Chemical Hygiene Officer approval	O-3
Dichloroethane	4	High School w/ Chemical Hygiene Officer approval	O-4 Flam Cabinet
Dichloroindophenol, Sodium Salt	2	Middle School	O-8
Diethylamine	4	High School w/ Chemical Hygiene Officer approval	O-2 Flam Cabinet
Diethylene Glycol Diethyl Ether	2	Middle School	O-2
Dimethyl Sulfoxide	4	High School w/ Chemical Hygiene Officer approval	O-7
Dimethylglyoxime	3	High School	O-2
Dimethylglyoxime Solution	3	High School	O-2 Flam Cabinet
Diphenylamine	3	High School	O-2
Dithizone	3	High School	O-2
Dodecanol	2	Middle School	O-2
Drierite	2	Middle School	Misc
Duplicating Fluid	3	High School	O-2 Flam Cabinet
Eosin Y	2	Middle School	O-9
Erbium - Metal Lump	3	High School	I-1
Eriochrome Black T	2	Middle School	O-9
Erythrosin B	2	Middle School	O-9
Ethanol	2	Middle School	O-2 Flam Cabinet
Ethidium Bromide	4	High School w/ Chemical Hygiene Officer approval	O-2
Ethoxyethanol	4	High School w/ Chemical Hygiene Officer approval	O-2
Ethyl Acetate	3	High School	O-3 Flam Cabinet
Ethylene Glycol	2	Middle School	O-2
Ethylenediamine Tetraacetic Acid	2	Middle School	O-1
FAA Solution	3	High School	O-2 Flam Cabinet
Fast Green	2	Middle School	O-9
Fehling's Solution A	2	Middle School	I-2
Fehling's Solution B	2	Middle School	I-4 Base Cabinet
Ferric Ammonium Citrate	2	Middle School	I-2
Ferric Ammonium Sulfate	2	Middle School	I-2
Ferric Oxide	2	Middle School	I-4
Ferric Sulfate	2	Middle School	I-2
Ferroin Solution	2	Middle School	Misc
Ferrous Oxide	2	Middle School	I-4
Ferrous Sulfate, Anhydrous	3	High School	I-2
Ferrous Sulfate, Heptahydrate	3	High School	I-2

Fiestaware	3	High School	I-1 Radioactive
Fluorescein	2	Middle School	O-9
Formalin	4	Banned from purchase as reagent. Only allowed as residual in preserved specimens.	O-3
Formalternate	2	Middle School	Misc
Formamide	4	High School w/ Chemical Hygiene Officer approval	O-2
Formic Acid	3	High School	O-1 Flam Cabinet
Fructose	0	All Grades	I-1
Fuchsin Acid	2	Middle School	O-1
Fuchsin Basic	2	Middle School	O-9
Fuller's Earth	2	Middle School	Misc
Fumaric Acid	3	High School	O-1
Furfural	4	High School w/ Chemical Hygiene Officer approval	O-3 Flam Cabinet
Gadolinium - Metal Lump	3	High School	I-1
Galactose	0	All Grades	O-2
Gallium - Metal Lump	3	High School	I-1
Gastric Juice	2	Middle School	I-9
Gelatin	0	All Grades	O-2
Gibberellic Acid	2	Middle School	O-1
Giemsa Stain	2	Middle School	O-9
Giemsa Stain Solution	2	Middle School	O-2 Flam Cabinet
Glucose	0	All Grades	Misc
Glutaraldehyde (<4%)	4	High School w/ Chemical Hygiene Officer approval	O-3
Glutaraldehyde (>4%)	4	High School w/ Chemical Hygiene Officer approval	O-3
Glutathione	3	High School	O-9
Glycerin	2	Middle School	O-2
Glycine	2	Middle School	O-1
Glycogen	2	Middle School	Misc
Glyoxal Solution	3	High School	O-3
Gram's Iodine Stain	2	Middle School	O-9
Graphite	2	Middle School	I-4
Guaiacol	4	High School w/ Chemical Hygiene Officer approval	O-4
Guar Gum	1	Elementary demos only	Misc
Gum Arabic	1	Elementary demos only	O-1
Gum Rosin	2	Middle School	O-1
Gunpowder	4	High School w/ Chemical Hygiene Officer approval	I-4
Helium	1	Elementary demos only	Gas - Non Flam
Hematoxylin	2	Middle School	O-9
Heptane	3	High School	O-3 Flam Cabinet
Hexachlorophene	4	High School w/ Chemical Hygiene Officer	O-3

		approval	
Hexamethylenediamine	3	High School	O-2 Base Cabinet
Hexamethylenediamine - Sodium Hydroxide Solution	3	High School	I-4 Base Cabinet
Hexane	3	High School	O-3 Flam Cabinet
Hexanol	3	High School	O-2 Flam Cabinet
Hydriodic Acid	4	High School w/ Chemical Hygiene Officer approval	I-9 Acid Cabinet
Hydrobromic Acid	3	High School	I-9 Acid Cabinet
Hydrochloric Acid (<1 molar)	1	Elementary demos only	I-9
Hydrochloric Acid (>6 molar)	3	High School	I-9 Acid Cabinet
Hydrochloric Acid (1 molar to 6 molar)	2	Middle School	I-9 Acid Cabinet
Hydrogen	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 1 lecture bottle.	Gas - Flammable
Hydrogen Peroxide (<4%)	1	Elementary demos only	Misc
Hydrogen Peroxide (20% to 30%)	3	High School	I-6
Hydrogen Peroxide (4% to 20%)	3	High School	I-6
Hydrogen Sulfide Water	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 milliliters	I-5
Hydroquinone	3	High School	O-4
Hydroxy Napthol Blue	2	Middle School	O-9
Hydroxylamine Hydrochloride	4	High School w/ Chemical Hygiene Officer approval	O-2
Immersion Oil	1	Elementary demos only	O-2
Indigo Carmine	2	Middle School	O-9
Indigo Dye	2	Middle School	O-9
Indium - Metal Lump	3	High School	I-1
Indole-3-Acetic Acid	2	Middle School	O-1
Indole-3-Butyric Acid	2	Middle School	O-1
Invertase	0	All Grades	O-2
Iodine	2	Middle School	I-2
Iodine Potassium Iodide Solution	2	Middle School	I-2
Iodine Tincture	2	Middle School	O-2 Flam Cabinet
Iron - Metal Lump	0	All Grades	Misc
Iron - Powder	1	Elementary demos only	I-1
Iron Chloride	2	Middle School	I-2
Iron Nitrate - 9 Hydrate	2	Middle School	I-3
Iron Nitrate - Anhydrous	2	Middle School	I-3
Iron Sulfide	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-5
Isobutanol	3	High School	O-2 Flam Cabinet
Isopropanol	1	Elementary demos only	O-2 Flam Cabinet

Isovaleric Acid	4	High School w/ Chemical Hygiene Officer approval	O-1
Janus Green B	2	Middle School	O-9
Kaolin	2	Middle School	I-4
Kerosene	2	Middle School	O-3 Flam Cabinet
Kinetin	2	Middle School	O-2
Kleermount in Xylene	3	High School	O-3 Flam Cabinet
Knop's Solution	2	Middle School	Misc
Krypton	2	Middle School	Gas - Non Flam
Lactic Acid	3	High School	O-1
Lactose	0	All Grades	I-1
Lanolin	1	Elementary demos only	Misc
Lantern Mantle	2	Middle School	Misc - Radioactive
Lanthanum Nitrate - Anhydrous	3	High School	I-3
Lanthanum Nitrate - Hexahydrate	3	High School	I-3
Latex	2	Middle School	O-3
Lauric Acid	2	Middle School	O-1
Lead - Metal Lump	2	Middle School	I-1
Lead Acetate - Dibasic	4	High School w/ Chemical Hygiene Officer approval	I-2
Lead Acetate - Monobasic	4	High School w/ Chemical Hygiene Officer approval	I-2
Lead Bromide	4	High School w/ Chemical Hygiene Officer approval	I-2
Lead Carbonate	4	High School w/ Chemical Hygiene Officer approval	I-4
Lead Carbonate - Basic	4	High School w/ Chemical Hygiene Officer approval	I-4
Lead Chloride	4	High School w/ Chemical Hygiene Officer approval	I-2
Lead Diiodide	4	High School w/ Chemical Hygiene Officer approval	I-2
Lead Dioxide	4	High School w/ Chemical Hygiene Officer approval	I-4
Lead Iodide	4	High School w/ Chemical Hygiene Officer approval	I-2
Lead Nitrate	3	High School. Storage limit: 100 grams.	I-3
Lead Oxide	4	High School w/ Chemical Hygiene Officer approval	I-4
Lead Sulfate	4	High School w/ Chemical Hygiene Officer approval	I-2
Lead Sulfide	4	High School w/ Chemical Hygiene Officer approval	I-5
Lead Tetroxide	4	High School w/ Chemical Hygiene Officer approval	I-4
Levulose	0	All Grades	O-2
Limewater	2	Middle School	I-4

Linseed Oil	2	Middle School	O-3 Flam Cabinet
Lipase	2	Middle School	O-9
Lithium - Metal Lump	3	High School. Storage limit: 10 grams.	I-1
Lithium Aluminum Hydride	4	High School w/ Chemical Hygiene Officer approval	I-1
Lithium Carbonate	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-4
Lithium Chloride	2	Middle School. Storage limit: 100 grams	I-2
Lithium Fluoride	3	High School	I-2
Lithium Hydroxide - Anhydrous	3	High School	I-4
Lithium Hydroxide - Monohydrate	3	High School	I-4
Lithium Nitrate	2	Middle School	I-3
Lithium Sulfate - Anhydrous	2	Middle School	I-2
Lithium Sulfate - Hydrate	2	Middle School	I-2
Litmus	0	All Grades	O-2
Lugol's Iodine	2	Middle School	I-2
Lull-A-Fly	3	High School	O-2 Flam Cabinet
Luminol	2	Middle School	Misc
Lycopodium	3	High School	O-2
Lysine HCl	2	Middle School	O-1
Lysozyme	2	Middle School	O-9
Magnesium - Metal Lump	2	Middle School	I-1
Magnesium - Powder	4	High School w/ Chemical Hygiene Officer approval	I-1
Magnesium Acetate	2	Middle School	I-2
Magnesium Bromide - Anhydrous	2	Middle School	I-2
Magnesium Bromide - Hexahydrate	2	Middle School	I-2
Magnesium Carbonate - Anhydrous	2	Middle School	I-4
Magnesium Carbonate - Hydrate	2	Middle School	I-4
Magnesium Chloride - Anhydrous	2	Middle School	I-2
Magnesium Chloride - Hexahydrate	2	Middle School	I-2
Magnesium Hydroxide	2	Middle School	I-4
Magnesium Nitrate - Anhydrous	2	Middle School	I-3
Magnesium Nitrate - Hexahydrate	2	Middle School	I-3
Magnesium Oxide	2	Middle School	I-4
Magnesium Perchlorate	4	High School w/ Chemical Hygiene Officer approval	I-6
Magnesium Sulfate	2	Middle School	I-2
Malachite Green	2	Middle School	O-9
Maleic Acid	3	High School	O-1
Malonic Acid	3	High School	O-1
Maltose, D- - Anydrous	0	All Grades	O-2
Maltose, D- - Monohydrate	0	All Grades	O-2
Manganese - Metal Lump	2	Middle School	I-1
Manganese (II) Chloride - Anhydrous	3	High School	I-2
Manganese (II) Chloride Tetrahydrate	2	Middle School	I-2
Manganese (II) Nitrate - Anhydrous	3	High School	I-3
Manganese (II) Nitrate - Tetrahydrate	2	Middle School	I-3
Manganese (II) Sulfate - Anhydrous	3	High School	I-2

Manganese (II) Sulfate - Monohydrate	2	Middle School	I-2
Manganese Carbonate	3	High School	I-4
Manganese Peroxide	3	High School	I-6
Mannitol	2	Middle School	O-2
Menthol	3	High School	O-2
Mercury - Elemental	4	Restricted: Only one wall-mounted barometer is allowed per school. All other elementary mercury is banned.	I-1
Methanol	3	High School	O-2 Flam Cabinet
Methionine	2	Middle School	O-1
Methyl Blue	2	Middle School	O-9
Methyl Cellulose	1	Elementary demos only	O-9
Methyl Ethyl Ketone	4	High School w/ Chemical Hygiene Officer approval	O-4 Flam Cabinet
Methyl Green	2	Middle School	O-9
Methyl Isopropyl Ketone	4	High School w/ Chemical Hygiene Officer approval	O-4 Flam Cabinet
Methyl Methacrylate	4	High School w/ Chemical Hygiene Officer approval	O-3 Flam Cabinet
Methyl Orange	3	High School	O-9
Methyl Paraben	2	Middle School	O-3
Methyl Red	2	Middle School	O-9
Methyl Red - Sodium Salt	2	Middle School	O-9
Methyl Salicylate	3	High School	O-3
Methyl Violet	2	Middle School	O-9
Methylene Blue	2	Middle School	O-9
Methylene Chloride	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 milliliters	O-4
Mineral Oil	1	Elementary demos only	O-2
Molisch Reagent	3	High School	O-2 Flam Cabinet
Molybdenum - Metal Lump	2	Middle School	I-1
Molybdenum - Powder	4	High School w/ Chemical Hygiene Officer approval	I-1
Molybdenum Trioxide	2	Middle School	I-4
Monosodium Glutamate	3	High School	O-1
Murexide	3	High School	O-2
Muriatic Acid	3	High School	I-9 Acid Cabinet
Naphthalene	3	High School w/ Chemical Hygiene Officer approval. Storage limit: 250 grams in sealed container.	O-3
Naphthalene Acetic Acid	3	High School	O-1
Naphthol, 1-	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	O-8
Naphthol, 2-	4	High School	O-8
Naphthol-6-Sulfonic Acid - Sodium Salt	3	High School	O-1
Naphthylethylenediamine Dihydrochloride	3	High School	O-2
Neodymium - Metal Lump	3	High School	I-1
Neodymium Chloride	3	High School	I-2

Neon	1	Elementary demos only	O-3 Flam Cabinet
Neutral Red	2	Middle School	O-9
Niacin	2	Middle School	Misc
Nickel - Metal Lump	2	Middle School	I-1
Nickel - Powder	4	High School w/ Chemical Hygiene Officer approval	I-1
Nickel Acetate	3	High School	I-2
Nickel Ammonium Sulfate	3	High School	I-2
Nickel Chloride - Anhydrous	3	High School	I-2
Nickel Chloride - Hexahydrate	3	High School	I-2
Nickel Monoxide	3	High School	I-4
Nickel Nitrate - Anhydrous	3	High School	I-3
Nickel Nitrate - Hexahydrate	3	High School	I-3
Nickel Sulfate - Anhydrous	3	High School	I-2
Nickel Sulfate - Hexahydrate	3	High School	I-2
Nickel Trioxide	3	High School	I-4
Nigrosin	3	High School	O-9
Ninhydrin	3	High School	O-2
Niobium - Metal Lump	2	Middle School	I-1
Nitric Acid (<1 molar)	3	High School. OK for Middle School if purchased prediluted at 1.0 molar or less.	I-9
Nitric Acid (>6 molar)	3	High School. Storage limit: 500 milliliters or a five-year supply, whichever is greater.	I-9 Acid Cabinet (Separate)
Nitric Acid (1 molar to 6 molar)	3	High School	I-9 Acid Cabinet (Separate)
Nitrilotriacetic Acid	4	High School w/ Chemical Hygiene Officer approval	O-1
Nitroacetanilide	3	High School	O-2
Nitrobenzaldehyde	3	High School	O-3
Nitrocellulose	3	High School	O-3
Nitrogen	2	Middle School	Gas - Non Flam
Nitrogen	2	Middle School	Gas - Non Flam
Nitrogen Tetroxide	4	High School w/ Chemical Hygiene Officer approval	I-4
Nitrogen Triiodide	4	Banned from purchase. Restricted to very small controlled demonstrations in AP Chemistry with Chemical Hygiene Officer approval.	O-4 Explosive
Nitrophenol, 3-	4	High School w/ Chemical Hygiene Officer approval	O-8
Nitrophenol, 4-	4	High School w/ Chemical Hygiene Officer approval	O-8
Nitrophenylazo Resorcinol	3	High School	O-8
Octadecanol	2	Middle School	O-2
Octanol, 1-	3	High School	O-2 Flam Cabinet

Octanol, 2-	3	High School	O-2 Flam Cabinet
Octyl Phenol	4	High School w/ Chemical Hygiene Officer approval	O-1
Oleic Acid	3	High School	O-1
Onion's Fusible Alloy	2	Middle School	I-1
Orange G	2	Middle School	O-9
Orange IV	2	Middle School	O-9
Orcein	2	Middle School	O-9
Orcinol	2	Middle School	O-8
Ortho-dichlorobenzene	4	High School w/ Chemical Hygiene Officer approval	O-3
Osmium - Metal Lump	4	High School w/ Chemical Hygiene Officer approval. Limit to observations in sealed container.	I-1
Oxalic Acid - Anhydrous	4	High School w/ Chemical Hygiene Officer approval	O-1
Oxalic Acid - Dihydrate	3	High School	O-1
Oxygen	3	High School	Gas - Oxidizing
Palladium - Metal Lump	3	High School	I-1
Palmitic Acid	2	Middle School	O-1
Pancreatin	2	Middle School	O-1
Papain	2	Middle School	O-9
Para-dichlorobenzene	4	High School w/ Chemical Hygiene Officer approval	O-3
Paraffin	0	All Grades	O-3
Penicillin G Sodium	2	Middle School	O-2
Pentane	4	High School w/ Chemical Hygiene Officer approval	O-3 Flam Cabinet
Pentanol, 1-	3	High School	O-2 Flam Cabinet
Pentanol, 2-	3	High School	O-2 Flam Cabinet
Peppermint Oil	2	Middle School	O-3
Pepsin	2	Middle School	O-9
Peptone	2	Middle School	Misc
Perchloroethylene	4	High School w/ Chemical Hygiene Officer approval	O-4
Permount	3	High School	O-3 Flam Cabinet
Petrolatum	0	All Grades	O-3
Petroleum Ether	2	Middle School	O-3 Flam Cabinet
pH 10 Buffer - Ammonium Hydroxide	2	Middle School	I-2
pH 10 Buffer - Borate	2	Middle School	I-2
pH 10 Buffer - Clear	2	Middle School	I-2
pH 4 Buffer - Acetate	2	Middle School	I-2
pH 4 Buffer - Biphthalate	2	Middle School	I-2
pH 7 Buffer - Phosphate	2	Middle School	I-2
pH 7.4 Buffer - Tris	2	Middle School	I-2

Phenanthroline	3	High School	O-2
Phenol	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 25 grams.	O-8
Phenol Red	2	Middle School	O-9
Phenolphthalein	2	Middle School	O-9
Phenolphthalein - Ethanol Solution	2	Middle School	O-2 Flam Cabinet
Phenyl Salicylate	2	Middle School	O-4
Phenylarsine Oxide - Solution	4	High School w/ Chemical Hygiene Officer approval	O-4
Phenylhydrazine Hydrochloride	4	High School w/ Chemical Hygiene Officer approval	O-2
Phloroglucinol	3	High School	O-9
Phosphomolybdic Acid	4	High School w/ Chemical Hygiene Officer approval	I-9 Acid Cabinet
Phosphoric Acid (<1 molar)	2	Middle School	I-9
Phosphoric Acid (>6 molar)	3	High School	I-9 Acid Cabinet
Phosphoric Acid (1 molar to 6 molar)	3	High School	I-9 Acid Cabinet
Phthalic Anhydride	3	High School	O-1
Polyethylene Glycol	2	Middle School	O-2
Polyurethane Foam - Part A	3	High School	O-5
Polyurethane Foam – Part B	3	High School	O-5
Polyvinyl Alcohol	2	Middle School	O-2
Potassium - 0.5 gram Chips	4	High School w/ Chemical Hygiene Officer approval. Storage limit: Three-year supply.	I-1
Potassium Acetate	2	Middle School	I-2
Potassium Bicarbonate	2	Middle School	I-4
Potassium Binoxalate	3	High School	I-2
Potassium Bisulfate	2	Middle School	I-2
Potassium Bitartrate	2	Middle School	I-2
Potassium Bromate	3	High School	I-6
Potassium Bromide	2	Middle School	I-2
Potassium Carbonate - Anhydrous	2	Middle School	I-4
Potassium Carbonate - Sesquahydrate	2	Middle School	I-4
Potassium Chlorate	3	High School	I-6
Potassium Chloride	2	Middle School	I-2
Potassium Chromate	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-8
Potassium Citrate	2	Middle School	I-2
Potassium Dichromate	3	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-8
Potassium Ferricyanide	3	High School	I-7
Potassium Ferrocyanide	3	High School	I-7
Potassium Fluoride	4	High School w/ Chemical Hygiene Officer approval	I-2
Potassium Hydrogen Phthalate	2	Middle School	O-4
Potassium Hydroxide - Solid	3	High School	I-4 Base Cabinet
Potassium Hydroxide (<1 molar)	2	Middle School	I-4

Potassium Hydroxide (>6 molar)	3	High School	I-4 Base Cabinet
Potassium Hydroxide (1 molar to 6 molar)	2	Middle School	I-4 Base Cabinet
Potassium Iodate	3	High School	I-6
Potassium Iodide	2	Middle School	I-2
Potassium Nitrate	3	High School or Middle School w/ Chemical Hygiene Officer approval.	I-3
Potassium Nitrite	3	High School	I-3
Potassium Oxalate	3	High School	I-2
Potassium Perchlorate	4	High School w/ Chemical Hygiene Officer approval	I-6
Potassium Periodate	3	High School	I-6
Potassium Permanganate	2	Middle School. Storage limit: 500 grams	I-8
Potassium Persulfate	3	High School	I-6
Potassium Phosphate - Dibasic	2	Middle School	I-2
Potassium Phosphate - Monobasic	2	Middle School	I-2
Potassium Phosphate - Tribasic	2	Middle School	I-2
Potassium Sodium Tartrate	2	Middle School	I-2
Potassium Sulfate	2	Middle School	I-2
Potassium Sulfide	3	High School	I-5
Potassium Tartrate	2	Middle School	I-2
Potassium Thiocyanate	2	Middle School	I-7
Praseodymium Chloride	3	High School	I-2
Propane	3	High School	Gas - Flammable
Propanol	3	High School	O-2 Flam Cabinet
Propiolactone, b-	4	High School w/ Chemical Hygiene Officer approval	O-4
Propionic Acid	3	High School	O-1 Flam Cabinet
Propylene Glycol	2	Middle School	O-2
Pyrogallol	3	High School	O-8
Quinine Sulfate	3	High School	I-2
Resazurin	3	High School	O-9
Resorcinol	3	High School	O-8
Rhodamine B	2	Middle School	O-9
Rhodium - Metal Lump	3	High School	I-1
Ringer's Solution	2	Middle School	I-2
Rose Bengal	2	Middle School	O-9
Ruthenium - Metal Lump	2	Middle School	I-1
Safranin	3	High School	O-9
Safranin O	2	Middle School	O-9
Safranin Staining Solution	2	Middle School	O-2 Flam Cabinet
Salicylic Acid	2	Middle School	O-1
Scandium - Metal Lump	2	Middle School	I-1
Schiff Reagent	3	High School	I-9 Acid Cabinet
Sebacoyl Chloride	3	High School	O-1

Sebacoyl Chloride/Hexane Solution	3	High School	O-3 Flam Cabinet
Silica Gel	2	Middle School	I-4
Silicon	2	Middle School	I-1
Silicon Oil	3	High School	Misc
Silver - Metal Lump	2	Middle School	I-1
Silver Acetate	3	High School	I-2
Silver Chloride	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-2
Silver Nitrate	3	High School or Middle School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-3
Silver Oxide	4	High School w/ Chemical Hygiene Officer approval	I-4
Silver Sulfate	3	High School	I-2
Soda Lime	3	High School	I-4 Base Cabinet
Sodium - 0.5 Gram Pieces	3	High School w/ Chemical Hygiene Officer approval. Storage limit: Three-year supply.	I-1
Sodium Acetate - Anhydrous	2	Middle School	I-2
Sodium Acetate - Hydrate	2	Middle School	I-2
Sodium Alginate	3	High School	O-1
Sodium Benzoate	2	Middle School	I-2
Sodium Bicarbonate	0	All Grades	I-4
Sodium Bifluoride	4	High School w/ Chemical Hygiene Officer approval	I-2
Sodium Bismuthate	3	High School	I-7
Sodium Bisulfate - Anhydrous	3	High School	I-2
Sodium Bisulfate - Monohydrate	3	High School	I-2
Sodium Bisulfite	2	Middle School	I-2
Sodium Borate	2	Middle School	I-8
Sodium Bromate	3	High School	I-6
Sodium Bromide	2	Middle School	I-2
Sodium Carbonate	2	Middle School	I-4
Sodium Chlorate	3	High School or Middle School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-6
Sodium Chloride	0	All Grades	I-2
Sodium Chromate - Anhydrous	4	High School w/ Chemical Hygiene Officer approval	I-8
Sodium Chromate - Tetrahydrate	4	High School w/ Chemical Hygiene Officer approval	I-8
Sodium Citrate	2	Middle School	I-2
Sodium Cobaltinitrite	4	High School w/ Chemical Hygiene Officer approval	I-3
Sodium Deoxycholate	3	High School	O-1
Sodium Dichloroindophenol	2	Middle School	O-9
Sodium Dichromate - Anhydrous	4	High School w/ Chemical Hygiene Officer approval	I-8
Sodium Dichromate - Dihydrate	4	High School w/ Chemical Hygiene Officer approval	I-8

Sodium Diphenylamine Sulfonate	3	High School	O-2
Sodium Ferricyanide	4	High School w/ Chemical Hygiene Officer approval	I-7
Sodium Ferrocyanide	4	High School w/ Chemical Hygiene Officer approval	I-7
Sodium Fluoride	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-2
Sodium Hexametaphosphate	2	Middle School	I-2
Sodium Hydroxide - Solid	3	High School	I-4 Base Cabinet
Sodium Hydroxide - solution (<1 molar)	2	Middle School	I-4
Sodium Hydroxide - solution (>6 molar)	3	High School	I-4 Base Cabinet
Sodium Hydroxide - solution (1 M to 6 M)	2	Middle School	I-4 Base Cabinet
Sodium Hypochlorite - Solution (<6%)	2	Middle School	I-6
Sodium Hypochlorite - Solution (>6%)	3	High School	I-6
Sodium Iodate	3	High School	I-6
Sodium Iodide	2	Middle School	I-2
Sodium Lactate	2	Middle School	Misc
Sodium Lauryl Sulfate	2	Middle School	O-2
Sodium Metabisulfite	3	High School	I-2
Sodium Metasilicate	3	High School	I-4
Sodium Molybdate - Anhydrous	3	High School	I-2
Sodium Molybdate - Dihydrate	3	High School	I-2
Sodium Nitrate	2	Middle School	I-3
Sodium Nitrite	3	High School	I-3
Sodium Oleate	2	Middle School	O-3
Sodium Oxalate	3	High School	I-2
Sodium Perborate	3	High School	I-8
Sodium Perchlorate	4	High School w/ Chemical Hygiene Officer approval	I-6
Sodium Peroxide	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 100 grams.	I-6
Sodium Phosphate - Dibasic - Anhydrous	2	Middle School	I-2
Sodium Phosphate - Dibasic - Heptahydrate	2	Middle School	I-2
Sodium Phosphate - Monobasic	2	Middle School	I-2
Sodium Phosphate - Tribasic	2	Middle School	I-2
Sodium Polyacrylate	2	Middle School	O-5
Sodium Rhodizonate	3	High School	O-1
Sodium Salicylate	3	High School	O-1
Sodium Silicate	2	Middle School	I-2
Sodium Sulfamate	3	High School	I-4
Sodium Sulfate	2	Middle School	I-2
Sodium Sulfide	4	High School w/ Chemical Hygiene Officer approval. Storage limit: 500 milliliters. Purchase as diluted solution.	I-5
Sodium Sulfite	3	High School	I-2
Sodium Tartrate Anhydrous	2	Middle School	I-2
Sodium Tartrate Dihydrate	2	Middle School	I-2

Sodium Thiocyanate	3	High School	I-7
Sodium Thiosulfate - Anhydrous	3	High School	I-2
Sodium Thiosulfate - Pentahydrate	2	Middle School	I-2
Sodium Tungstate	3	High School	I-2
Stannic Chloride	3	High School	I-2
Stannous Chloride	3	High School	I-2
Starch	0	All Grades	O-2
Stearic Acid - Laboratory Grade	2	Middle School	O-1
Stearic Acid - Reagent Grade	2	Middle School	O-1
Streptomycin Sulfate	3	High School	O-2
Strontium	4	High School w/ Chemical Hygiene Officer approval	I-1
Strontium Bromide	2	Middle School	I-2
Strontium Carbonate	2	Middle School	I-4
Strontium Chloride	2	Middle School	I-2
Strontium Hydroxide Octahydrate	3	High School	I-4 Base Cabinet
Strontium Hydroxide Solution	3	High School	I-4
Strontium Nitrate	2	Middle School	I-3
Styrene	3	High School	O-3 Flam Cabinet
Succinic Acid	3	High School	O-1
Sucrose	0	All Grades	O-2
Sudan III	2	Middle School	O-9
Sudan III Solution	2	Middle School	O-9 Flam Cabinet
Sudan IV	2	Middle School	O-9
Sudan IV Solution	2	Middle School	O-9 Flam Cabinet
Sudan Yellow	4	High School w/ Chemical Hygiene Officer approval	O-9
Sulfamic Acid	3	High School	I-9 Acid Cabinet
Sulfanilamide	3	High School	I-3
Sulfanilic Acid	3	High School	O-1
Sulfosalicylic Acid	3	High School	O-1
Sulfur - Precipitated	3	High School	I-10
Sulfur Hexafluoride	4	High School w/ Chemical Hygiene Officer approval	Gas - Non Flam
Sulfurated Potash	4	High School w/ Chemical Hygiene Officer approval	I-5
Sulfuric Acid (<1 molar)	2	Middle School	I-9
Sulfuric Acid (>6 molar)	3	High School	I-9 Acid Cabinet
Sulfuric Acid (1 molar to 6 molar)	2	Middle School	I-9 Acid Cabinet
Talc	2	Middle School	Misc
Tannic Acid	3	High School	O-1
Tantalum - Metal Lump	3	High School	I-1
Tartaric Acid	2	Middle School	O-1
Tellurium - Metal Lump	3	High School	I-1

Tert-Butanol	3	High School	O-2 Flam Cabinet
Tetracycline Hydrochloride	3	High School	O-2
Tetramethyl-p-phenylenediamine Dihydrochloride	3	High School	O-2
Thermit	3	High School or Middle School w/ Chemical Hygiene Officer approval. Storage limit: 500 grams.	I-4
Thermit Igniting Sticks	3	High School or Middle School w/ Chemical Hygiene Officer approval. Storage limit: 500 grams.	I-4
Thiamine Hydrochloride	2	Middle School	Misc
Thioacetamide	4	High School w/ Chemical Hygiene Officer approval	O-2 Flam Cabinet
Thionin	3	High School	O-9
Thiourea	4	High School w/ Chemical Hygiene Officer approval. Restricted to purchase as taste test strips.	O-2
Thulium - Metal Lump	3	High School	I-1
Thymol	2	Middle School	O-9
Thymol Blue	2	Middle School	O-9
Thymolphthalein	2	Middle School	O-9
Thymolphthalein Solution	2	Middle School	O-2 Flam Cabinet
Thyroxine	3	High School	O-1
Tin - Metal Lump	0	All Grades	I-1
Tin - Powder	3	High School	I-1
Tin Oxide	3	High School	I-4
Titanium - Metal Lump	2	Middle School	I-1
Titanium Dioxide	2	Middle School	I-4
Toluene	4	High School w/ Chemical Hygiene Officer approval	O-3 Flam Cabinet
Toluidine Blue O	2	Middle School	O-9
Toluidine, o-	4	High School w/ Chemical Hygiene Officer approval	O-2 Flam Cabinet
Tricaine Methanesulfonate	3	High School	O-9
Trichloroacetic Acid	3	High School	O-1
Triethanolamine	4	High School w/ Chemical Hygiene Officer approval	O-2
Triethylamine	4	High School w/ Chemical Hygiene Officer approval. Storage limit: Four small vials.	O-2 Flam Cabinet
Trimethylamine	4	High School w/ Chemical Hygiene Officer approval	O-2 Flam Cabinet
Triphenyl Tetrazolium Chloride	3	High School	O-9
Tris-Hydroxymethyl Aminomethane	3	High School	O-3
Triton X-100	3	High School	O-2
Tungsten - Lump	2	Middle School	I-1
Turpentine	3	High School	O-3 Flam Cabinet
Tyrosine	2	Middle School	O-1

Universal Indicator	2	Middle School	O-2 Flam Cabinet
Urea	3	High School	O-2
Urease	2	Middle School	Misc
Urethane	3	High School	O-5
Vegetable Oil	2	Middle School	Misc
Winkler's Solution #1	2	Middle School	I-2
Winkler's Solution #2	3	High School	I-4
Wood's Metal	4	High School w/ Chemical Hygiene Officer approval	I-1
Wright's Stain	2	Middle School	O-9
Wright's Stain Solution	2	Middle School	O-9 Flam Cabinet
Xenon	2	Middle School	Gas - Non Flam
Xylene	4	High School w/ Chemical Hygiene Officer approval	O-3 Flam Cabinet
Xylose	0	All Grades	O-2
Ytterbium - Metal Lump	2	Middle School	I-1
Yttrium - Metal Lump	2	Middle School	I-1
Yttrium Oxide	4	High School w/ Chemical Hygiene Officer approval	I-4
Zeolite	3	High School	I-4
Zinc - Metal Lump	1	Elementary demos only	Gas - Non Flam
Zinc - Powder	3	High School	I-1
Zinc Acetate	2	Middle School	I-2
Zinc Carbonate	2	Middle School	I-4
Zinc Carbonate - Basic	2	Middle School	I-4
Zinc Chloride	3	High School	I-2
Zinc Nitrate - Anhydrous	3	High School	I-3
Zinc Nitrate - Hexahydrate	3	High School	I-3
Zinc Oxide	2	Middle School	I-4
Zinc Stearate	3	High School	O-3
Zinc Sulfate - 7-Hydrate	2	Middle School	I-2
Zinc Sulfate - Anhydrous	3	High School	I-2
Zinc Sulfate - Monohydrate	2	Middle School	I-2
Zinc Sulfide	3	High School	I-5
Zirconium - Metal Lump	2	Middle School	I-1
Zirconium Tetranitrate	3	High School	I-3

Appendix D – Compatible Chemical Storage Chart

Storage Pattern for Chemicals Where Space is Limited
Inorganic Reactives & Metals (I-1, I-10)
Sulfur, Phosphorus (double packaged), Arsenic, Solid Metals, Hydrides, Lithium, Sodium
Inorganic Salts (I-2)
Chlorides, Iodides, Fluorides, Bromides, Sulfates, Sulfites Thiosulfates, Phosphates.
Inorganic Oxidizers (I-3, I-6, I-8)
Nitrates, Nitrites, Borates, Chromates, Manganates, Permanganates, Chlorates, Chlorites, Peroxides, Azides
Inorganic Corrosive Bases (O-4) (Dry Chemicals)
Dry Hydroxides, Oxides, Silicates, Carbonates, Carbon
Inorganic #5 and #7 Toxins
Arsenates, Cyanides, Sulfides, Selenides, Phosphides, Carbides, Nitrides
Corrosive Base Storage Cabinet (I-4 Liquids)
>1.0 molar Ammonium Hydroxide, Sodium Hyroxide, Calcium Hydroxide (limewater), Potassium Hydroxide, Oxides, Silicates
Dilute solutions at or below 1.0 molar can be stored on shelves rather than in cabinets. Segregate inorganic and organic compounds. Check containers annually for condition of containers, labels and contents. Replace degraded lids, dropper tops and solutions.

Organic Toxins (O-5, O-7)
Epoxy Compounds, Isocyanates, Sulfides, Polysulfides
Organic Reactives #6
Peroxides, Azides, Hydroperoxides
Flammable Storage Cabinet (O-2, O-3, O-4, O-8 & concentrated organic bases)
Alcohols, Glycols, Phenol, Hydrocarbons, Cresols, Esters, Ethers, Propionic Acid, Formic Acid, Glacial Acetic Acid, Lactic Acid
Dry and Dilute Organic Acids & Anhydrides (O-1)
Citric Acid, Anhydrides, Peracids, etc.
Miscellaneous
Household chemicals (vinegar, baking soda, vegetable oils), Dyes, Stains, Agars, Sugars, Gels
Non-metal Corrosive Acid Storage Cabinet (I-9 Liquids)
Hydrochloric Acid, Sulfuric Acid, Hydrobromic Acid, Phosphoric Acid, Perchlorid Acid. Nitric acid separately stored in this or another cabinet. Limit Nitric Acid to a 5 year supply.
To prevent release of corrosive vapors, avoid storing pipettes holding acids or bases in test tubes taped to the side of bottles. Wrap fritted glass stoppers on acid bottles in parafilm to reduce evaporation. Store Iodine crystals in a sealed plastic bag to monitor degradation of the container's cap and reduce indoor air pollution.

Appendix E – Laboratory Do's and Don'ts

Do This	Don't Do This
Keep access open to eyewashes, safety showers and emergency cut-offs.	Stack items adjacent to them.
Test eyewashes, fume hoods, safety showers at the recommended schedule.	Wait until there's a chemical exposure to test your safety equipment.
Read the chemical hygiene plan and practice emergency response procedures.	Wait until there's an emergency to learn how to respond to it.
Keep PPE in good working order and readily available.	Let your PPE degrade, get contaminated or disappear when you need it.
Purchase chemicals suitable for your grade level in quantities that will last less than two years.	Accept donated chemicals or buy more than a two-year supply of useful chemicals.
Update the chemical inventory annually. Maintain a restock box to track materials that need replacing or removal.	Lose track of chemical containers until their contents or containers degrade.
Return chemicals to their proper storage location when you're done using them.	Not put chemicals away at the end of a lesson or place them on a shelf beside a container of an incompatible compound.
Label containers properly.	Allow labels to degrade or use an improper label on a container.
Keep the chemical storage area secured.	Leave the stockroom door unlocked or allow students to be in the stockroom unsupervised.
Track chemical waste management practices on log sheets to demonstrate proper disposal.	Improperly dispose of hazardous materials down the drain or in the trash.
Keep your chemical hygiene training updated with periodic refreshers.	Assume the chemical hygiene program is being handled by someone else.
Review the chemicals in your inventory against the King County Banned List and dispose of any you find properly.	Assume there are no highly hazardous chemicals in your lab without ensuring that's the case.

Appendix F – Conducting an Initial Inventory

Conducting an initial chemical inventory is time-consuming and may pose risks to the individuals doing the work; and ample time should be allowed to properly conduct it. The good news is that maintaining the inventory in coming years can be a very simple process that takes minimal work.

Only those who have technical knowledge about the chemicals should be involved in the inventory--students should never be involved! Serious injury can result from moving chemical containers that have become compromised or have contents that have degraded over time. If any chemical container is unmarked, bulging, leaking, rusted, cracked or has a degraded top, liquid above a solid, or crystals in a liquid, it should not be moved, even for the inventory. It is best to be cautious!

Inventories provide staff with a list of both the useful chemicals on site and those no longer needed. Be sure to indicate those chemicals that are staying and those that will be disposed.

Step-By-Step Guide

1) Allow ample time to conduct the inventory.
2) Get the inventory template from the King County Rehab the Lab website by following these steps:

a) Visit http://www.lhwmp.org/educators/chemlist.aspx.
b) Click the words "--- Download results as… --- " inside the box on the left and select "Inventory List" from the drop-down choices.
c) Click on the small Excel icon beside the "--- Download results as… --- " box.
d) Save the Excel table that opens up to your computer. It's now ready to be used as your electronic inventory spreadsheet.

3) Work in pairs if possible. It is best if one team does the entire inventory.
4) Be sure the areas in which you are working have adequate lighting.
5) Wear gloves, protective eyewear, a lab coat and closed-toed shoes.
6) Provide access to a phone, eyewash and a safety shower.
7) Study the chemical hygiene emergency response plan in case of a spill or accident.
8) Have a printed copy of the District's Banned Lab Chemicals List (Appendix B) with you to identify the highest hazard chemicals.
9) One person should act as the recorder and the other person should list the chemicals. Have the recorder read the chemical name aloud after it is recorded to confirm it is correct.

a) It is often easier to hand-write the inventory initially and then enter it into the spreadsheet afterwards.

10) Enter the chemical stockroom and get a general feel for its layout, cleanliness, organization, accessibility of exits, ventilation system, etc.
11) If chemicals are stored above eye level, find and use a safety step stool or a small stepladder to reach the higher shelves.
12) Record room number, date and inventory takers on each page.
13) Record the name of each chemical, the size of the container(s) or the approximate amount of the chemical on hand.

14) For unfamiliar chemicals, check their names against the Banned List to see if they are highly hazardous. Do not touch or move chemicals if they are listed as potential explosives or the container appears distorted in any manner.
15) Use extreme caution when moving a container to avoid dropping it or knocking one over.
16) If the inventory is conducted over several days, be sure you mark where you stopped at the end of the day.
17) If kits are present, be sure to inventory all chemicals in each kit. Although kits are particularly time consuming to inventory, each container must be identified. Record the name of each chemical, the size of the container(s) or the approximate amount of chemical on hand. Do not ignore the kits--many contain carcinogens such as cadmium powder or toxic chemicals such as sodium azide.
18) If preserved specimens are present, record the specimen name followed by the name of the holding solution used, the container size and number of similar containers (e.g., Frogs – Carosafe, 5 gals X 4).
19) Be sure to examine all areas in each room including desks and drawers for chemical-containing devices like thermometers, sling psychrometers, bromine tubes, etc.
20) Once the inventory is complete for each room, transfer the gathered information into the Excel spreadsheet; and when saving it, identify the school, month and year in the file name.

When it is time to update the inventory, check the restock box and only adjust the information for chemicals that will be added to the inventory or removed from the inventory. **If an empty chemical container is being replaced by another of identical size, there is no need to adjust the inventory**.

Appendix G –Skin Absorption and Inhalation Toxins

Reference: www.lhwmp.org/educators/chemlist.aspx

Chemical Name	Acute Exposure Hazard
Acetic Acid (>6 Molar)	Combustible liquid and vapor. Corrosive. Toxic by skin contact. Slightly toxic by ingestion.
Acetonitrile	Flammable. Toxic by inhalation. Reacts with acids to form poisonous cyanide gas.
Aitch-tu-ess Cartridges	Produces poisonous and flammable Hydrogen Sulfide gas when heated.
Ammonium Oxalate - Anhydrous	Reported toxic by ingestion and inhalation. Corrosive if inhaled or swallowed.
Ammonium Oxalate - Monohydrate	Reported toxic by ingestion and inhalation. Corrosive if inhaled or swallowed.
Benzonitrile	Combustible. Toxic by skin contact and ingestion. In contact with acids or fire may produce toxic cyanide gas.
Benzyl Alcohol	Toxic by skin contact. Slightly toxic by ingestion. Irritant.
Benzylaminopurine	Toxic by inhalation. Slightly toxic by ingestion.
Beryllium - Metal Lump	Reported poison by inhalation and ingestion with LD50s for beryllium compounds of 0.5 to 5 mg/kg.
Bromine	Corrosive. Oxidizer. Toxic by inhalation. Deactivate with Sodium Thiosulfate. Reported lethal dose to humans of 14 mg.
Butoxyethanol	Combustible. Toxic by ingestion and skin contact. Slightly toxic by inhalation.
Butyric Acid	Corrosive. Combustible. Toxic by skin contact. Slightly toxic by ingestion. Stench.
Camphor	Solid becomes flammable liquid when heated. Ingestion can cause convulsions. Reported to be a poison by inhalation.
Carbol Fuchsin	Toxic by inhalation, ingestion and skin contact.
Clove Oil	Toxic by skin contact. Slightly toxic by ingestion.
Congo Red	Sensitizer by skin contact. Irritant. Metabolizes to benzidine when inhaled or ingested.
Copper - Powder	Assumed toxic by inhalation. OSHA limits are a very low 1 mg/cubic meter of air. Ingestion can cause ulceration of mouth and stomach.
Cupric Sulfide	Reacts with acids to form poisonous and flammable Hydrogen Sulfide gas. No acute toxicity data due to insolubility.
Cyclohexanone	Flammable. Toxic by skin contact. Slightly toxic by ingestion. Irritant.
Decanoic Acid	Irritant. Toxic by skin contact. Slightly toxic by ingestion.

Dibutyl Phthalate	Toxic by inhalation. Low toxicity by ingestion and skin contact.
Dichloroethane	Flammable. Slightly toxic by ingestion and skin contact. Inhalation and ingestion are reported to cause liver, kidney, and adrenal gland damage.
Diethylamine	Flammable. Corrosive to skin and eyes. Toxic by skin contact. Slightly toxic by ingestion.
Dimethyl Sulfoxide	Irritant. No acute toxicity data reported. Absorbs readily through the skin and can carry other chemicals into the body in this way. Slightly combustible in concentrated form.
Ethidium Bromide	Dust is reported to be very toxic when inhaled.
Ethoxyethanol	Slightly toxic by ingestion and skin contact. Reported to be poisonous by skin contact.
Formamide	Toxic by skin contact. Irritant. Low toxicity by ingestion.
Formic Acid	Flammable. Corrosive. Toxic by inhalation.
Glutaraldehyde (<4%)	Toxic by ingestion. Slightly toxic by skin contact. Irritant. Reported poison by inhalation.
Glutaraldehyde (>4%)	Toxic by ingestion. Slightly toxic by skin contact. Irritant. Reported poison by inhalation.
Hexachlorophene	Toxic by skin contact and ingestion. Irritant. Used as a disinfectant in the past (Phisohex-TM).
Hexamethylenediamine	Corrosive. Toxic by skin contact. Slightly toxic by ingestion.
Hexamethylenediamine - Sodium Hydroxide Solution	Corrosive. Toxic by skin contact and by ingestion. Causes blindness in contact with eye tissues.
Hexane	Flammable. Irritant. Low toxicity by ingestion. Reported toxic by inhalation.
Hydriodic Acid	Corrosive. Toxic by inhalation and ingestion.
Hydrobromic Acid	Corrosive. Toxic by inhalation and ingestion.
Hydrochloric Acid (>6 molar)	Corrosive. Toxic by inhalation and ingestion.
Hydrogen Peroxide (20% to 30%)	Corrosive. Oxidizer. Toxic by inhalation. Slightly toxic by skin contact.
Hydroxylamine Hydrochloride	Corrosive. Toxic by inhalation and ingestion.
Isovaleric Acid	Corrosive. Toxic by skin contact. Slightly toxic by ingestion. Stench.
Lithium Hydroxide - Anhydrous	Corrosive. Toxic by ingestion. Poison by inhalation.
Lithium Hydroxide - Monohydrate	Corrosive. Toxic by ingestion. Poison by inhalation.
Lull-A-Fly	Flammable. Toxic by ingestion, inhalation and skin contact. Irritant.
Maleic Acid	Corrosive. Toxic by skin contact. Slightly toxic by ingestion.
Mercury - Elemental	Corrosive. No acute toxicity data. Reported toxic by ingestion and inhalation. Bulk mercury is banned from Washington schools.

Molisch Reagent	Flammable. Toxic by skin contact. Slightly toxic by ingestion. Irritant.
Naphthol, 1-	Combustible solid. Toxic by ingestion. Toxic by skin contact.
Nitric Acid (>6 molar)	Corrosive. Oxidizer. Toxic by ingestion. Reported poison by inhalation. Multiple incompatibilities.
Nitric Acid (1 molar to 6 molar)	Corrosive. Oxidizer. Toxic by ingestion. Reported toxic by inhalation.
Nitrogen Tetroxide	Oxidizer. Toxic by inhalation.
Nitrophenol, 3-	Toxic by ingestion and skin contact. Irritant.
Nitrophenol, 4-	Toxic by ingestion and skin contact. Irritant.
Octyl Phenol	Corrosive. Combustible solid. Toxic by skin contact. Slightly toxic by ingestion.
Phenol	Corrosive. Combustible. Toxic by inhalation, skin contact and ingestion.
Phenylarsine Oxide - Solution	Corrosive to eyes. Severe Irritant. Arsenic compound. Reported to be toxic by ingestion, skin contact and inhalation at high concentrations.
Phosphoric Acid (>6 molar)	Corrosive. Toxic by ingestion and skin contact.
Polyurethane Foam - Part B	Poison by inhalation. Contains isocyanates. Use in fume hood or by exhaust fan. Irritant.
Potassium Chromate	Oxidizer. Corrosive. Toxic by ingestion or inhalation of dusts. Reported to be poisonous by contact with broken skin.
Potassium Ferricyanide	Irritant. No acute toxicity data reported. Reacts with acids to form poisonous cyanide gas.
Potassium Ferrocyanide	Irritant. No acute toxicity data reported. Reacts with acids to form poisonous cyanide gas.
Potassium Hydroxide (>6 molar)	Corrosive. Toxic by skin contact and by ingestion. Causes blindness in contact with eye tissues.
Potassium Nitrite	Oxidizer. Toxic by ingestion and inhalation. Irritant.
Potassium Sulfide	Flammable. Corrosive. Spontaneously combustible if dry. Reacts with acids to form poisonous and flammable Hydrogen Sulfide gas.
Propionic Acid	Flammable. Corrosive. Toxic by ingestion and skin contact.
Resorcinol	Toxic by ingestion and skin contact (easily absorbed). Irritant. Sensitizer.
Sebacoyl Chloride	Corrosive. No acute toxicity data reported. Inhalation can cause pulmonary edema, a life-threatening lung ailment.
Sodium Dichromate - Anhydrous	Oxidizer. Toxic by ingestion and skin contact. Corrosive when wet. Irritant. Reported to be poisonous by contact with broken skin.

Sodium Dichromate - Dihydrate	Oxidizer. Toxic by ingestion and skin contact. Corrosive when wet. Irritant. Reported to be poisonous by contact with broken skin.
Sodium Ferricyanide	Irritant. No acute toxicity data. Reacts with acids to form poisonous cyanide gas.
Sodium Ferrocyanide	Irritant. No acute toxicity data. Reacts with acids to form poisonous cyanide gas.
Sodium Hydroxide - solution (>6 molar)	Corrosive. Toxic by skin contact and by ingestion. Causes blindness in contact with eye tissues.
Sodium Hypochlorite - Solution (>6%)	Corrosive. Toxic by ingestion and inhalation. Irritant.
Sodium Nitrite	Oxidizer. Toxic by ingestion and inhalation. Irritant.
Sodium Oxalate	Corrosive. Irritant. Reported toxic by ingestion and inhalation. Lethal dose is 15 - 30 grams.
Sodium Sulfide	Combustible. Toxic by ingestion, inhalation and skin contact. Reacts with acids to form poisonous and flammable Hydrogen Sulfide gas.
Stannic Chloride	Corrosive. Toxic by inhalation.
Sulfuric Acid (>6 molar)	Corrosive. Oxidizer. Poisonous by inhalation of mists. Slightly toxic by ingestion.
Toluene	Flammable. Slightly toxic by ingestion and inhalation. Irritant. Reported to be poison by skin contact. Drug precursor. Theft risk.
Triethylamine	Flammable. Toxic by ingestion, inhalation and skin contact. Irritant.
Turpentine	Flammable. Irritant. Toxic by inhalation.
Winkler's Solution #2	Corrosive. Toxic by skin contact and by ingestion. Causes blindness in contact with eye tissues.
Zinc Chloride	Corrosive. Toxic by inhalation and ingestion.
Zinc Sulfide	Toxic by inhalation, ingestion and skin contact. Reacts with acids to form poisonous and flammable Hydrogen Sulfide gas.

Appendix H – Regulatory Citations

Most of the guidance found in this CHP is based on regulatory requirements found in federal and state codes.

Regulatory citations listed include the Revised Codes of Washington (RCW), Uniform Fire Code (UFC), National Electrical Code (NEC) and Washington Administrative Code (WAC).

- WAC 173 governs the work of the State Department of Ecology, which oversees environmental protection.
- WAC 246 governs the work of the State Health Department, which oversees student safety and other health-related codes.
- WAC 296 governs the work of the Department of Labor and Industries, which oversees worker safety and health.
- WAC 51 governs building codes.

Issue Discussed in Chemical Hygiene Plan	Citation
Flammable liquid storage	UFC 7902.5.8 WAC 296-24-33009
First aid kits	WAC 296-800-150
Ground fault interrupters	WAC 296-24-95607 NEC 210-8(b)
Laboratory air supply rates	WAC 296-62-11007
Separated lab air supply provided	WAC 296-62-075 WAC 51-13-304 & Table 3-4
Minimum lighting in labs	WAC 246-366-120(1)
Chemical inventories mandated for labs	WAC 296-800-17005 & -17010
Mandated chemical hygiene plan	WAC 296-62-40009
Emergency eyewashes and safety showers	WAC 296-800-15030 & -15035
Chemical fume hood use	WAC 296-62-40025 & -4005 & -4009
Directional signs for shut-off valves	WAC 296-62-40025
Security and design of stockrooms	WAC 296-62-40009 & -40025
Proper chemical labeling and storage	WAC 296-62-40025
High risk chemicals in schools	WAC 296-62-40009 WAC 246-366-140
Personal protective equipment	WAC 296-800-160 WAC 296-62-40025 & -40009
Fire blanket specifications	WAC 296-62-40025
Spill plans	WAC 296-62-40025
Hazardous waste disposal	WAC 173-303 WAC 296-62-40025

Issue Discussed in the CHP	Citation
Training	WAC 296-800-17030 WAC 296-62-40011
Fire extinguishers	WAC 296-800-30010 WAC 296-62-40025
Biology specimens	WAC 296-62-07540 WAC 296-62-080
Materials Safety Data Sheets	WAC 296-800-17035 WAC 296-62-40011& -40015 WAC 296-901-14014
Gloves and closed toed shoes	WAC 296-800-16065 & -16060 WAC 296-62-40025
Mercury banned from schools	RCW 70.95

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
CHEMICAL HAZARD MANAGEMENT				
• Containers of non-hazardous substances (e.g., distilled water) shall be labeled to avoid confusion. (All containers must be labeled regardless of the contents.)	**X**		WAC 296-800-17025 WAC 296-901-14012	
• A mercury barometer is allowed, but not recommended. Mercury shall be disposed of in compliance with EPA and ECY regulations. Mercury-free barometers are available (e.g., the "Eco-Celli" barometer).		**X**	RCW 70.95M WAC 173-303	
• Formaldehyde should not be in K-12 schools. Laboratories using formaldehyde solutions must comply with the OSHA Occupational Standard for Formaldehyde. Biology specimens stored in formaldehyde should be decanted and held in a formaldehyde-free alternative (e.g., Flinnsafe, Carosafe, propylene glycol, or alcohol solution). Formaldehyde disposal shall adhere to the ECY Dangerous Waste Regulations.		**X**	WAC 296-856 29 CFR 1910.1048 WAC 173-303 Prudent Practices 11.C.1	
• Glassware should be free of all cracks, chips, sharp edges and other defects.		**X**	Prudent Practices 4.E.9	
• Biology specimens should be stored in sealed containers to prevent evaporation of liquid contents and resulting IAQ issues. Specimens preserved in hazardous or dangerous chemicals, e.g., alcohol, should be stored in locked cabinets. A flammable cabinet may be required.		**X**	Prudent Practices 5.E.1	
EMERGENCY AND WASTE MANAGEMENT				
• All laboratories shall have a written clean-up plan for spills. All laboratories shall have a spill clean-up kit or materials for absorbing spills identified and readily available to students and staff.	**X**		WAC 296-828-20005 Prudent Practices 2.F Prudent Practices 6.C.10.6	
• Waste shall be disposed in accordance with ECY regulations. No waste or chemicals shall be poured down the drain or put in the garbage without approval from local sewer or solid waste authorities.	**X**		WAC 173-303 Prudent Practices 8.B.6.2	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
EYE, LUNG AND SKIN PROTECTION				
• Instructors shall wear PPE when using corrosive, toxic, reactive, or irritating chemicals and during hazardous activities as required by L & I WISHA rules.	**X**		WAC 296-800-160 WAC 296-155 Prudent Practices 7.C.3	
• Fume hoods shall be used when using known or suspected carcinogens, mutagens, teratogens and chemicals which are fast acting/highly toxic, listed as toxic via skin absorption or inhalation or chemicals with a TLV or PEL of 50 ppm or less. This determination shall be based on information provided by the SDS.	**X**		WAC 296-841-20010 Prudent Practices 9.C.1	
• Eye protection, safety glasses and face shields shall meet ANSI requirements. Students shall wear PPE when using corrosive, toxic, reactive or irritating chemicals and during hazardous activities.	**X**		ANSI Z87.1 WAC 246-366-140 RCW 70.100 WAC 296-800-160 WAC 296-155-215 Prudent Practices 6.C.2.2	
• A sink with soap and paper towels shall be available in the lab for hand washing.	**X**		WAC 296-800-23025	
• Emergency eyewash and shower stations shall be provided when there is a potential for exposure to corrosives, strong irritants or toxic chemicals. They shall be located within 50 feet or ten seconds walking distance from all lab science work stations.	**X**		WAC 246-366-140(2) WAC 296-800-15030 ANSI Z 358.1 Prudent Practices 7.F.2.5	
• Emergency showers shall deliver water to cascade over the user's entire body at a minimum rate of 20 gallons (75 liters) per minute for 15 minutes or more.	**X**		WAC 296-800-15030 ANSI Z 358.1 Prudent Practices 7.F.2.5.1	
• Eye-wash stations and emergency showers shall be handicap accessible and operable "hands-free" so that the user can hold both eyes open. Hand-held showers and eye-wash equipment do not meet current L & I WISHA rules (except as auxiliary or extra protection).	**X**		WAC 296-800-15030 ANSI Z 358.1 Prudent Practices 7.F.2.5 ADA Title III	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Eye-wash stations shall provide 0.4 gallons (1.5 liters) per minute for 15 minutes or more. In some areas with high water pressure, flow regulators may be required on the eye-wash stations.	**X**		WAC 296-800-15030 ANSI Z 358.1 Prudent Practices 6.F.2.5 ADA Title III	
• Emergency showers and eye-wash units shall be inspected and tested for proper operation annually. Plumbed emergency eye washes must be activated weekly. Written documentation of tests shall be maintained on site.	**X**		WAC 296-800-15035 Prudent Practices 7.F.2.5	
• Fire retardant lab coats shall be used as required by L & I WISHA PPE rules when appropriate for a specific project or demonstration.	**X**		CFR 1910.132(d)(1) Prudent Practices 6.C.2.6.2	
• A first aid kit shall be provided and adequately stocked in the lab area.	**X**		WAC 296-800-15020 Prudent Practices 2.F.2	
• Appropriate gloves, matched to the hazard, shall be provided and worn when the potential for hand contact with chemicals exists.	**X**		WAC 296-800-16065	
• Closed-toed shoes shall be worn at all times in the laboratory. (No sandals or perforated shoes.)	**X**		WAC 296-800-16060	
• A non-asbestos fire blanket should be provided, identified, readily available and visible to students and staff.		**X**	Prudent Practices 6.C.10.9	
• Safety shields on the demonstration table should be used for demonstrations wherever the possibility of explosion exists.		**X**	Prudent Practices 7.F.2.2	
• Ethidium Bromide is hazardous via skin contact or ingestion. Gloves and eye protection shall be worn when handling it. Only purchase Ethidium Bromide in kits and, when done using it, dispose as toxic hazardous waste.		**X**	WAC 173-303-090,170	
• Jewelry should not be worn if personal safety would be jeopardized.		**X**	Prudent Practices 7.C.8.4.2	
• Loose hair should be restrained so that personal safety is not jeopardized.		**X**	Prudent Practices 7.C.8.4.2	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
MECHANICAL AND ELECTRICAL EQUIPMENT				
• There shall be an on-demand, mechanical ventilation system providing additional air exchange as required by codes for chemical areas such as photo darkrooms, storerooms and chemistry labs. (This is in addition to the building HVAC system.)	**X**		WAC 51-52/IMC 401, 403 WAC 296-841-20010 WAC 296-828-20005 Prudent Practices 9.C NFPA 45 Chapter 8	
• All hazardous chemical fumes and vapors shall vent directly to the outside to prevent return into the building or the building HVAC system.	**X**		WAC 296-62-13620 WAC 296-841-20010 (2) WAC 51-52/IMC 501 Prudent Practices 9.C NFPA 45	
• Make-up air shall be of ample quantity to replace the exhausted air and shall be tempered when necessary.	**X**		WAC 296-62-13625 WAC 51-52/IMC 501 Prudent Practices 9.C NFPA 45	
• Only UL approved heating devices shall be used in laboratories.	**X**		IFC 605	
• Electrical receptacles shall be properly grounded. GFI devices shall be provided on all electrical receptacles within six (6) feet of sinks and other grounding sources.	**X**		WAC 296-24-95705 NFPA 70/NEC 210-8(b) NFPA 45-5.6 Prudent Practices 7.C.1.1	
• All electrical equipment shall be properly grounded. Portable electrical equipment shall be double-insulated or provided with a UL-listed ground prong.	**X**		WAC 296-800-28040 WAC 296-24-95705 WAC 296-24-95709 NFPA 70/NEC Prudent Practices 7.C.1.1	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Electrical extension cords shall be UL-listed and the wire size shall be appropriate for the applied use.	**X**		WAC 296-800-28040 WAC 296-24-95707,95709 IFC 605 NFPA 70/NEC Prudent Practices 7.C.1.1	
• There shall be at least one fume hood for each laboratory where hazardous chemicals are used. A demonstration hood is also recommended with clear sides so students can view demonstrations from three sides.	**X**		WAC 296-828-20005 Prudent Practices 7.C.1.2 29 CFR 1910.1450 App A	
• All fume hoods shall exhaust directly to the outside, away from all occupied areas and air intakes, in order to prevent exhaust from reentering the building.	**X**		WAC 296-62-13620 WAC 51-52/IMC 501 Prudent Practices 9.C.2	
• Fume hoods in school buildings shall comply with AHERA asbestos regulations.	**X**		AHERA	
• All electrical devices such as switches, lights and motors used in the fume hood shall be explosion-proof.	**X**		NFPA 70/NEC Prudent Practices 7.C.1.2	
• Electrical panel circuit breaker switches for the lab shall be accessible and the breakers labeled. A clear and unobstructed means of access with a minimum width of 30 inches and a minimum height of 78 inches shall be maintained from the operating face of an electrical panel board.	**X**		WAC 296-800-28022 WAC 296-800-28025 WAC 51-54/IFC 605.3, 8509 NFPA 70/NEC 110.26	
• Fire extinguishers (ABC type) shall be provided. Fire extinguishers shall be identified and readily accessible to staff and students. The instructor shall be trained in fire extinguisher use. Demonstration or hands-on training shall be provided during safety orientation.	**X**		WAC 296-800-30005, 30010, 30025 Prudent Practices 7.F.2.3.1	
• A fire alarm system shall be provided. Alarm pull stations shall be identified and readily accessible to staff and students.	**X**		WAC 296-800-31070 Prudent Practices 7.F.2	
• Master gas shut-offs shall be provided--the location clearly visible and accessible--and indicated by means of a sign. Master electricity and water shut-offs are recommended. Directional signs should be provided to safety items in all lab areas.	**X**		WAC 51-56/UPC 12.1151-54 IFC 2703.2.2.1, 3503.1.3, WAC 296-806-20008, 20012	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Fume hood air velocity should be 60-125 LFM checked quarterly with a velocity meter. Written documentation of all tests should be maintained on site. The exhaust capture path should direct contaminants away from the user. With the sash raised to 12 inches, the air flow should measure at least 60 LFM.		**X**	WAC 296-828-20005 ASHRAE 10-1995 ANSI Z 9.5 29 CFR 1910.1450 App A(C)(4) Prudent Practices 9.C.2	
STORING AND HANDLING CHEMICALS				
• Chemicals shall be organized and stored to separate incompatible groups. Labels shall clearly denote the identity of the container's chemical contents, warnings about its health and physical hazards and the date received.	**X**		WAC 296-800-17025 Prudent Practices 5.E.2, Prudent Practices – Table 5.1	
• Food items (for human consumption) shall not be permitted in chemical laboratories or storerooms (including lab refrigerators). No eating, drinking or gum chewing shall be allowed in labs to prevent poisoning through ingestion. All food items to be used for experiments shall be labeled "Not for Human Consumption."	**X**		29 CFR 1910.141 (g) (2) & (4) Prudent Practices 6.C.2.3	
• Chemical storerooms shall be lockable and inaccessible to unsupervised students and have self-closing doors. Doors shall have a one-hour fire rating.	**X**		WAC 51-54/IFC 2703.8.3.2 WAC 51-50/IBC 414.2.4 Prudent Practices 2.D.2	
• Chemicals marked only with teacher codes (e.g., A, B, C,…), for student testing/analysis, shall not be allowed in permanent storage. All containers shall be stored in a way that allows identification of their contents.	**X**		WAC 296-800-17025 Prudent Practices 5.E.2	
• All flammables shall be stored in approved flammable storage cabinets with self-closing doors. Flammables (red labels) and acids and bases (white labels) shall be stored separately. Fire departments recommend **not** venting flammables cabinets.	**X**		WAC 296-24-33009 Prudent Practices 5.E.5	
• Elemental mercury, mercury thermometers, mercury compounds and other mercury-containing devices shall not be in Washington State schools.	**X**		WAC 246-366-140 RCW 70.95M	
• Only explosion-proof refrigerators shall be used to store volatile chemicals. Non explosion-proof refrigerators or other electrical devices shall not be located in areas with vaporous or flammable chemicals.	**X**		29 CFR 1910.307 Prudent Practices 7.C.3	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Chemicals should not be stored in fume hoods for over 24 hours.		**X**	WAC 296-828-20005 Prudent Practices 9.C.2 29 CFR 1910.1450 App A(D)	
• There should be a separate storage shelf, cabinet or area for water-reactive compounds (e.g., metallic sodium, potassium or calcium) and organic peroxides.		**X**	Prudent Practices 5.E.7	
• Chemical storage areas should be clean, well-organized and have sufficient space to allow segregation of incompatible chemicals and easy access to storage shelves and exit doors.		**X**	IFC 2703.9.8 Prudent Practices 2.D.2	
• Chemical storerooms should have sturdy, well-supported shelves secured to the walls. All shelves should have "earthquake" (or "spill-prevention") lips on all shelf edges. Doors that close on cabinets do not replace the need for spill-containment "lips" on the front edge of shelves.		**X**	Prudent Practices 2.D.2	
• Chemical storerooms should have all hazardous chemicals stored at or below eye level (typically below 5' 6") with heavy objects stored on lower shelves. Higher shelves may be used for other items; e.g., glassware, equipment, paper goods, etc.		**X**	Prudent Practices 2.D.2	
• Chemical storage areas should be kept cool (between 55 and 80 degrees F) and dry (relative humidity between 30 and 60%).		**X**	Prudent Practices 2.D.2	
• Chemicals should be stored according to their properties in compatible storage groups, not alphabetically.		**X**	Prudent Practices 5.E.2	
• All acids should be stored in approved acid cabinets. Isolate flammable acids like glacial acetic acid from oxidizing acids like nitric and sulfuric acid. Non-metal cabinets are recommended to prevent corrosion of the cabinet. Vent acid cabinets to prevent build-up of hazardous vapors.		**X**	IFC (2009) 2701.3.3.3 Prudent Practices 5.E	
TRAINING AND DOCUMENTATION				
• The Chemical Hygiene Officer (e.g., science department chairperson or science teacher) shall develop and carry out a written CHP. It should include an operation and maintenance program for laboratory fume hoods and other mechanical equipment in science laboratories.	**X**		WAC 296-828-20005 Prudent Practices 9.C.2	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
• A written and documented lab safety orientation that includes components of the CHP shall be provided for all staff and students.	**X**		WAC 296-828-20005 Prudent Practices 2.B	
• A telephone for reporting emergencies shall be located in or near the laboratory. Emergency telephone numbers shall be readily accessible. Staff shall be trained in emergency procedures.	**X**		RCW 28A.335.320 Prudent Practices 3.D.2.1	
• Lab floor plans shall be kept in the school office. A listing of exits, chemicals, and storage place of chemicals shall be included for use by emergency responders. Exits shall be clearly marked and free of obstruction.	**X**		29 CFR 1910.1450 App A Prudent Practices App. A	
• Science laboratories shall have an inventory list of all chemicals. This list must be updated periodically. (The recommendation is annually or more frequently.)	**X**		WAC 296-800-17005 WAC 296-800-17010 RCW 28A.320.125(3)(b) Prudent Practices 2.D.4	
• SDS shall be kept and readily available for all chemicals in the lab.	**X**		29 CFR 1910.1200(b)(4)(ii) Prudent Practices 4.B.2	
• Science laboratories shall have a written CHP that is available to all students and staff members. It shall be reviewed annually and updated when necessary. (New science teachers shall review the CHP as part of their Employee Safety Orientation.)	**X**		WAC 296-828-20005 Prudent Practices 2.B	
• Invisible hazards (radiation, chemical, electrical, laser and heat) should be posted with warning signs or symbols when present.		**X**	ANSI C95.2 OSHA Tech Manual Sec. III: Chap 6 (VI)(E)(1) Prudent Practices 7.C.8.1	
• Schools should only store and use chemicals appropriate for their level of science instruction. The Local Hazardous Waste Management Program in King County maintains a comprehensive database of school chemicals which includes exposure hazards, environmental toxicity, common experiments, grade suitability and a grade-based hazard rating. Chemicals in the data base rated as “Banned” should not be used in K-12 schools.		**X**	WAC 246-366-140 LHWMP School Chemicals List Database	

SCIENCE CLASSROOM & LAB REFERENCE for environmental, health and safety guidance (abbreviations defined below)	**Required**	**Recommended**	**WAC or Other Reference**	**Inspection Checklist:** Check if compliant. Report problems to administration.
• Chemicals should be purchased in the smallest commercially available container or in an amount that will meet the school's needs for approximately two academic years, whichever is greatest. All chemicals should be dated upon receipt into the lab or storage area.		**X**	WAC 246-366-140 Prudent Practices 5.B.1 Prudent Practices 5.B.5 Prudent Practices 5.C.1	
• CDC/NIOSH/USCPSC School Chemistry Laboratory Safety Guide is available on-line.			CDC School Chemistry Lab Safety Guide download	
• The Local Hazardous Waste Management Program in King County operates a website for teachers and students relating to laboratory safety in schools.			LHWMP Rehab the Lab website	
• EPA's Schools Chemical Cleanout Campaign has useful references.			EPA SC3 website	
• National Science Teachers Association has safety in the science classroom resources.			NSTA Safety in Science Classroom website	

Guide to Abbreviations and References

AHERA – Asbestos Hazard Emergency Response Act
ANSI – American National Standards Institute

- ANSI C95 – Standard for Radio Frequency Energy and Current Flow Symbols
- ANSI Z9.5 – Laboratory Ventilation and Decommissioning Package
- ANSI Z87.1 – Standard for Occupational and Educational Eye and Face Protection Devices
- ANSI Z358.1 – Emergency Eyewash and Shower Equipment

ASHRAE – American Society Heating Refrigeration Air Conditioning Engineers
CFR - Codes of the Federal Register

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

CDC – Centers for Disease Control and Prevention
CHP – Chemical Hygiene Plan
ECY - Washington State Department of Ecology
EPA – Environmental Protection Agency
GFI - Ground fault interrupter
L & I – Labor and Industries
LFM – Linear feet per minute
HVAC – Heating, ventilation and air conditioning
IAQ – Indoor air quality
IFC - International Fire Code

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

IMC - International Mechanical Code and state Building Code

- IMC 51-52 –

MSDS - Material safety data sheets
NFPA - National Fire Protection Association

- NFPA 70/NEC 110 – National Electrical Code

NIOSH – National Institute for Occupational Safety and Health
PEL - Prudent Practices - Prudent Practices in the Laboratory – National Research Council
RCW - Revised Codes of the State of Washington

- RCW 28A – Common School Provisions
- RCW 70.95 – Solid Waste Management
- RCW 70.100 – Eye Protection

TLV – Threshold limit value
UL – Underwriters' Laboratories
UPC - Uniform Plumbing Code

- 51-56 UPC – Uniform Plumbing Code

USCPSC - United States Product Safety Commission
WAC - Washington Administrative Code

- WAC 51-50 – State Building Code/International Building Code
- WAC 51-52 – State Building Code/International Mechanical Code
- WAC 51-54 – State Building Code/International Fire Code
- WAC 51-56 – State Building Code/International Plumbing Code
- WAC 173-303 – Dangerous Waste Regulations
- WAC 246-366 – Primary and Secondary Schools
- WAC 296-24 – Container and Tank Storage
- WAC 296-62 – General Occupational Health Standards
- WAC 296-155 – Occupational Health and Environmental Control
- WAC 296-800 – Safety and Health Core Rules
- WAC 296-806 – Operating Controls
- WAC 296-828 – Using Hazardous Chemicals in Laboratories
- WAC 296-841 – Airborne Contaminants
- WAC 296-856 – Formaldehyde

WISHA – Washington Industrial Safety and Health Act of 1973