SCHOOL LEADERSHIP OSHA SCIENCE SAFETY GUIDANCE

A RESOURCE FOR EDUCATORS

FLINN SCIENTIFIC

2020

School Leadership Osha Science Safety Guidance:
District Supervisor and Chemical Hygiene Officer Training

Flinn has been the Safer Source for Science for over 40 years, dedicated to making school laboratories a safe environment for both students and instructors.

Designed to help school district level leaders navigate the OSHA laws regarding science programs, we will review the OSHA Lab Standard and how it applies to your teachers and to the overall school system.

We'll cover Annual inspections, Chemical Hygiene Officer, Chemical Hygiene Plans, and much more.

OVERVIEW OF THIS SESSION

- **OSHA Laboratory Standard Summary**
- **Key Points From the Chemical Hygiene Plan & Right to Know Laws**
- **Best Practices in the Laboratory**
- **Common Concerns and OSHA Checklist**

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OSHA LABORATORY STANDARD SUMMARY

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OSHA vs Cal-OSHA comparisons

Cal/OSHA has adopted occupational safety and health standards which are at least as effective as Federal OSHA standards. Cal/OSHA has also adopted the following unique standards[1]:

- Toxic Chemical Handling and Exposure
- Agriculture
- Repetitive Motion Injuries
- Child Labor
- Heat Exposure
- Noise Exposure
- Injury and Illness Prevention Program
- Aerosol Transmissible Diseases
- Petroleum Drilling and Production
- Petroleum Refining, Transport, and Handling
- Workplace Violence Prevention in Health Care

ENFORCEMENT PROGRAMS

Cal/OSHA, a part of DIR, implements the California State Plan's enforcement and consultation. Cal/OSHA utilizes the Division of Labor Standards Enforcement (DLSE)'s Policies and Interpretations Manual to provide guidance for the enforcement program. Compliance officers inspect workplaces for hazardous conditions and issue citations and orders where violations are identified. Inspections may be the result of regular scheduling, imminent danger reports, fatalities, and worker complaints or referrals. DLSE enforces the law prohibiting retaliation for occupational safety or health activity. More information on enforcement can be found on the California State Plan website.

1. OSHA California State

Common Issues with Messy Labs and Prep Areas

We find issues in labs and prep rooms in many schools. Having issues with keeping spaces organized and safe is common, but dangerous.

Common Issues with Messy Labs and Prep Areas

A common messy situation in school laboratories—these images show a hazardous chemical storage cabinet. It appears to store ALL chemicals in one spot.

OSHA Laboratory Standard (29 CFR 1910.1450)

Laboratory Safety: OSHA Laboratory Standard OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450), referred to as the Laboratory standard, covers laboratories where chemical manipulation generally involves small amounts of a limited variety of chemicals.

This standard applies to all hazardous chemicals meeting the definition of "laboratory use" and having the potential for worker exposure.

This means school laboratories and prep rooms—*since January 1991*

OSHA Lab Standard Fact Sheet

OSHA® FactSheet

Laboratory Safety OSHA Laboratory Standard

OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450), referred to as the Laboratory standard, covers laboratories where chemical manipulation generally involves small amounts of a limited variety of chemicals. This standard applies to all hazardous chemicals meeting the definition of "laboratory use" and having the potential for worker exposure.

Hazardous chemicals present physical and/or health threats to workers in clinical, industrial, and academic laboratories. Hazardous laboratory chemicals include cancer-causing agents (carcinogens), toxins that may affect the liver, kidney, or nervous system, irritants, corrosives, and sensitizers, as well as agents that act on the blood system or damage the lungs, skin, eyes, or mucous membranes. OSHA rules limit all industry exposures to approximately 400 substances.

Elements of the Laboratory Standard

This standard applies to employers engaged in laboratory use of hazardous chemicals.[1]

- "Laboratory" means a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.
- "Laboratory use of hazardous chemicals" means handling or use of such chemicals in which all of the following conditions are met:
  - Chemical manipulations are carried out on a "laboratory scale" (i.e., work with substances in which the containers used for reactions, transfers, and other handling of substances is designed to be easily handled by one person);
  - Multiple chemical procedures or chemicals are used;
  - The procedures involved are not part of a production process, nor do they in any way simulate a production process; and
  - "Protective laboratory practices and equipment" are available and in common use to minimize the potential for worker exposure to hazardous chemicals.
- Any hazardous chemical use which does not meet this definition is regulated under other standards. This includes other hazardous chemical use within a laboratory. For instance:
  - Chemicals used in building maintenance of a laboratory are not covered under the Laboratory standard.
  - The production of a chemical for commercial sale, even in small quantities, is not covered by the Laboratory standard.
  - Quality control testing of a product is not covered under the Laboratory standard.
- If the Laboratory standard applies, employers must develop a Chemical Hygiene Plan (CHP). A CHP is the laboratory's program which addresses all aspects of the Laboratory standard.
  - The employer is required to develop and carry out the provisions of a written CHP.
  - A CHP must address virtually every aspect of the procurement, storage, handling, and disposal of chemicals in use in a facility.
- Primary elements of a CHP include the following:
  - Minimizing exposure to chemicals by establishing standard operating procedures, requirements for personal protective equipment, engineering controls (e.g., chemical fume hoods, air handlers, etc.) and waste disposal procedures.
  - For some chemicals, the work environment must be monitored for levels that require action or medical attention.
  - Procedures to obtain free medical care for work-related exposures must be stated.
  - The means to administer the plan must be specified.
  - Responsible persons must be designated for procurement and handling of Material Safety Data Sheets, organizing training sessions, monitoring employee work practices, and annual revision of the CHP.

[1] **Note:** The scope of the Formaldehyde standard (29 CFR 1910.1048) is not affected in most cases by the Laboratory standard. The Laboratory standard specifically does not apply to formaldehyde use in histology, pathology, and human or animal anatomy laboratories; however, if formaldehyde is used in other types of laboratories which are covered by the Laboratory standard, the employer must comply with 29 CFR 1910.1450.

Additional Information

The following OSHA Interpretations of the Laboratory standard provide additional information:

- Labeling Requirements under the HAZCOM and Laboratory standards; use of safe needle devices. (2001, January 11). Available at: www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=23781. Also, for labeling information, refer to the Laboratory Safety QuickCard.
- Coverage of various types of laboratories by the Laboratory standard. (1991, February 8). Available at: www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=20190.
- The Laboratory standard does not apply to a pharmacy operation mixing cytotoxic drugs. (1990, June 22). Available at: www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=20025.

OSHA's Safety and Health Topics Page entitled Laboratories, provides more detailed information about the Laboratory standard and is available at: www.osha.gov/SLTC/laboratories/index.html.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; the teletypewriter (TTY) number is (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

OSHA® Occupational Safety and Health Administration
www.osha.gov 1-800-321-6742

OSHA FS-3464 8/2011
DSG

1. https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-osha-lab-standard.pdf

Key Pieces of the Laboratory Standard to Know:

You must have a CHP (Chemical Hygiene Plan) in place for your school that covers all aspects of the Laboratory Standard. This is a legal document that outlines the procedures in the laboratory area with emphasis on the following:

- General laboratory rules and procedures
- Personal protective equipment requirements
- Accidental Spill and accident prevention procedures
- Chemical storage rules and procedures
- Safety equipment requirements and inspection procedures
- Employee safety training
- Exposure and medical evaluations
- Emergency evacuation plan
- Access to Information on SDS's
- Labelling Requirements for chemicals under HAZCOM & OSHA RTK Laws

All of these aspects of the CHP occur with the understanding that we are to minimize risk by using the proper PPE, following established safety protocols, utilizing functional safety equipment (fume hoods, eye wash stations etc.) and choosing to use the safest/ lowest concentration chemicals).

For this to be effective it also requires more than just procedures:

YOU NEED TO DESIGNATE A CHEMICAL HYGIENE OFFICER TO FACILITATE THE CHP IMPLEMENTATION.

Key Pieces of the Laboratory Standard to Know:

You must have functional PPE, engineering controls, preventative measures and fire safety equipment, in place for your school. Basic Safety starts here:

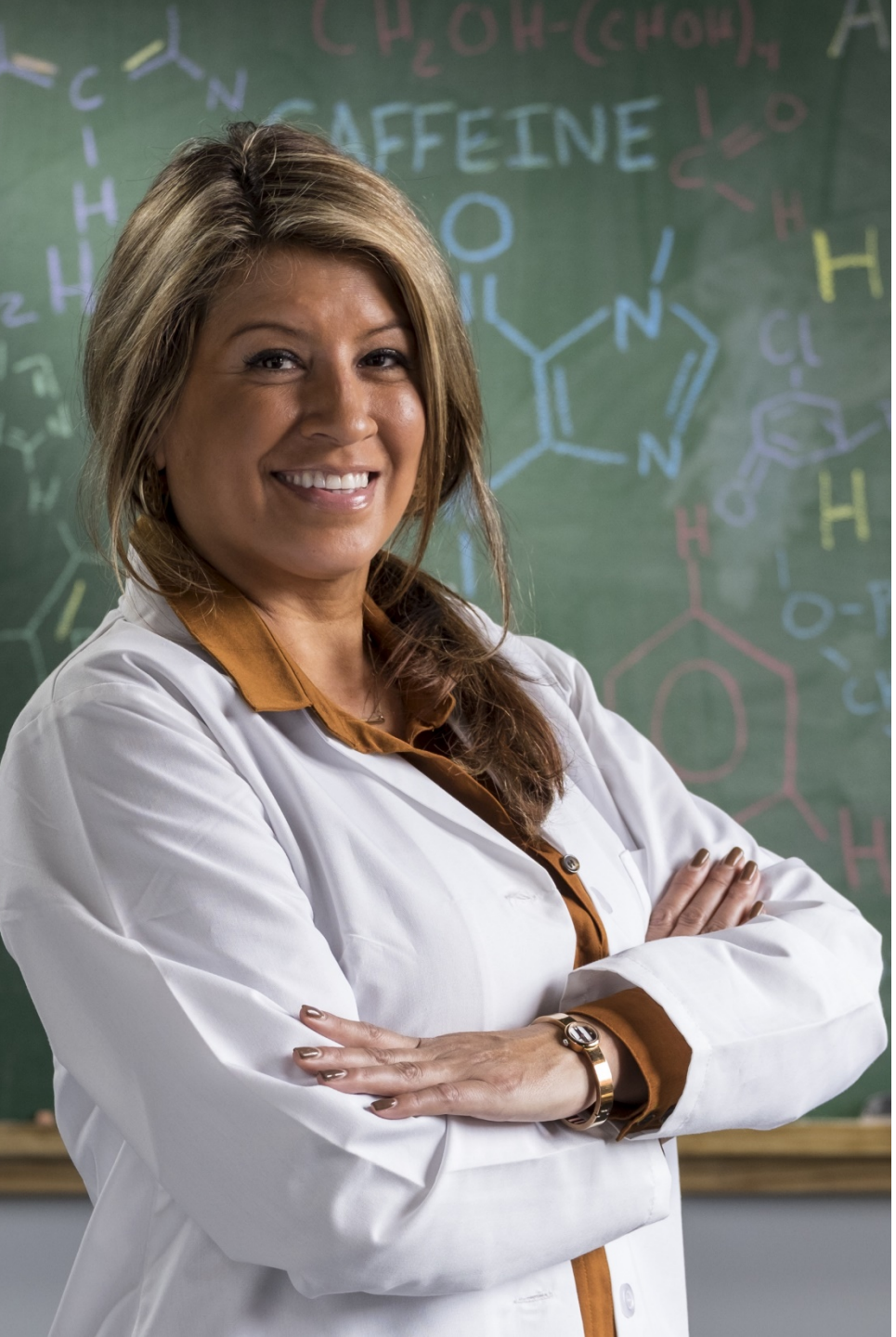
1. **PPE (Goggles/Gloves/Face Shield/Hearing Protection/Respirator)**
2. **Engineering Controls (Fume Hood/Eyewash/Drench Shower/Chemical Safety Cabinets/Chemical Spill Kit/**
3. **Fire Safety (Extinguisher/Fire Blanket/Detector/Fire Alarm/Evacuation Procedure Signage)**
4. **Employee Training – Are your teachers trained in safety procedures?**

1. https://www.flinnsci.com/safety

Chemical Hygiene Plan

In May of 1990, the federal government passed an extension of the Hazard Communication Act written specifically for the research and academic laboratory. Most states also passed a version of the Laboratory Standard. Enforcement of the new Laboratory Standard began in January of 1991. The Laboratory Standard is very similar in many ways to the original law. **The major difference is the requirement to have a formalized Chemical Hygiene Plan and a designated Chemical Hygiene Officer.**

A Chemical Hygiene Plan (CHP) is a written report summarizing all your safety regulations, proper laboratory procedures for handling hazardous chemicals, and training procedures. It is a dynamic document that is reviewed <u>annually at a minimum</u> and revisions made as necessary.



CHEMICAL HYGIENE OFFICER
Role & Accountability (29 CFR 1910.1450)

- OSHA states the employer is required to appoint a chemical hygiene officer. You cannot use an outside consultant – **must be an employee**.
- OSHA defines the Chemical Hygiene Officer as "an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan."
- **In those schools where the employer has not appointed a CHO, the superintendent of schools has the responsibility. Most superintendents are unaware of this fact, and lack the technical and safety precursor qualifications needed for such a position but are default CHO's**

1. https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1450

Chemical Hygiene Officer Summary Expectations

It is essential that the chemical hygiene officer has proper training in accordance with OSHA Laboratory Standard 29CFR 1910.1450.

While it cannot be assumed that the person designated to be the school's chemical hygiene officer has a background in chemistry or in chemical health & safety, adequate training should be provided by the school district.

The chemical hygiene officer has the responsibility to conduct and manage a chemical inventory, evaluate chemicals for proper storage and labeling, deem what is appropriate in quantity and what is excess, and know how to dispose of waste chemicals.

There are also safety considerations when reviewing chemical inventory such as, what chemicals are potentially explosive or reactive, are there known carcinogens, pharmaceuticals, broken or leaking containers.

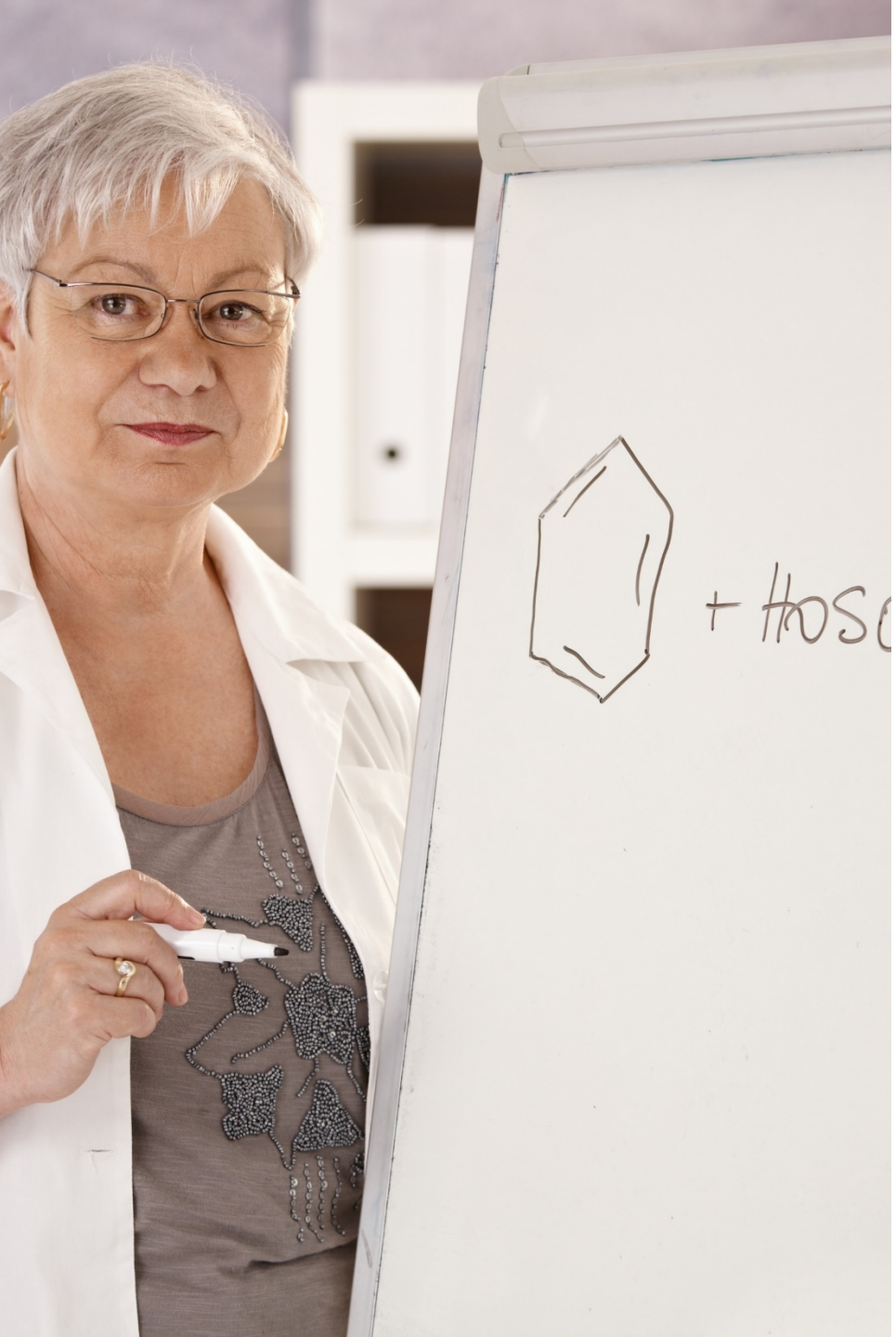
Duties of a Chemical Hygiene Officer

Work	Work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices
Monitor	Monitor procurement, use and disposal of chemicals used in the lab
Review	Review all purchase orders that include chemical reagents & safety items
Review	Review all lab procedures, including all new procedures to be introduced
Ensure	Ensure that staff training and facilities are adequate for materials ordered
Ensure	Ensure all SDS forms are available and current; labels are GHS compliant
See	See that appropriate safety inspections / audits are maintained
Help	Help building safety chairperson, principals and department chairs to develop precautions and adequate facilities

Duties of a Chemical Hygiene Officer Continued

Know	Know the current legal requirements concerning regulated substances; (OSHA, NIOSH, NFPA, etc.)
Review	Review CHP annually and continually seek ways to improve it
Ensure	Ensure that workers know and follow the chemical hygiene rules
Provide	Provide adequate training for all workers regarding safety, chemical hygiene and chemical hazards
Determine	Determine the appropriate protective equipment required and ensure that it is available and in good working order

1. https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-chemical-hygiene-plan.html



Observation and Documentation: Duties of a Chemical Hygiene Officer

Provide regular, formal, chemical hygiene and housekeeping inspections:	A. Stockrooms and storerooms B. Lab ventilation C. Sinks and clean up areas
Regularly inspect all safety and emergency equipment to ensure it is in good working order:	A. Fume hoods B. Fire equipment C. Eye stations and deluge showers D. Protective apparel
Maintain records:	A. Training B. Inspections C. Medical D. Inventory E. Accidents and spills

1. https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-chemical-hygiene-plan.html

Chemical Hygiene Plan Summary

The CHP is a manual that describes your laboratory regulations, proper lab procedures, and how to respond to emergency situations. The listing of rules and procedures are your Standard Operating Procedures.

These rules and procedures must be well thought out with the principal goal of always minimizing the exposure of employees and students to hazardous chemicals. And this must be managed by the Chemical Hygiene Officer.

1. https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-chemical-hygiene-plan.html

Chemical Hygiene Plan Includes:

- General laboratory rules and procedures (SOP's)
- Personal protective equipment requirements
- Accidental Spill and accident prevention procedures
- Chemical storage rules and procedures
- Safety equipment requirements and inspection procedures
- Employee safety training (topical, practical, on-going)
- Exposure and medical evaluations
- Emergency evacuation plan
- Designation of a Chemical Hygiene Officer (CHO)

1. https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-chemical-hygiene-plan.html

Chemical Hygiene Plan / Right to Know Laws

The various state Right to Know laws are all very similar. The six major requirements or provisions discussed above are always included, along with minor modifications concerning who must be trained and how or to whom you will have to send lists of the actual SDS and hazardous materials on-site and how often those lists are populated and sent. The paperwork requirements (SDS and reporting lists) can be overwhelming, but are mandated by the state and federal laws.

THE SCIENCE TEACHER'S FIVE MAJOR STEPS INCLUDE:

1. Take an inventory (develop a list of hazards)
2. Acquire, update, and maintain Safety Data Sheets (SDS)
3. Label and identify all chemicals properly
4. Training & Practice Drills
5. Develop a Chemical Hygiene Plan

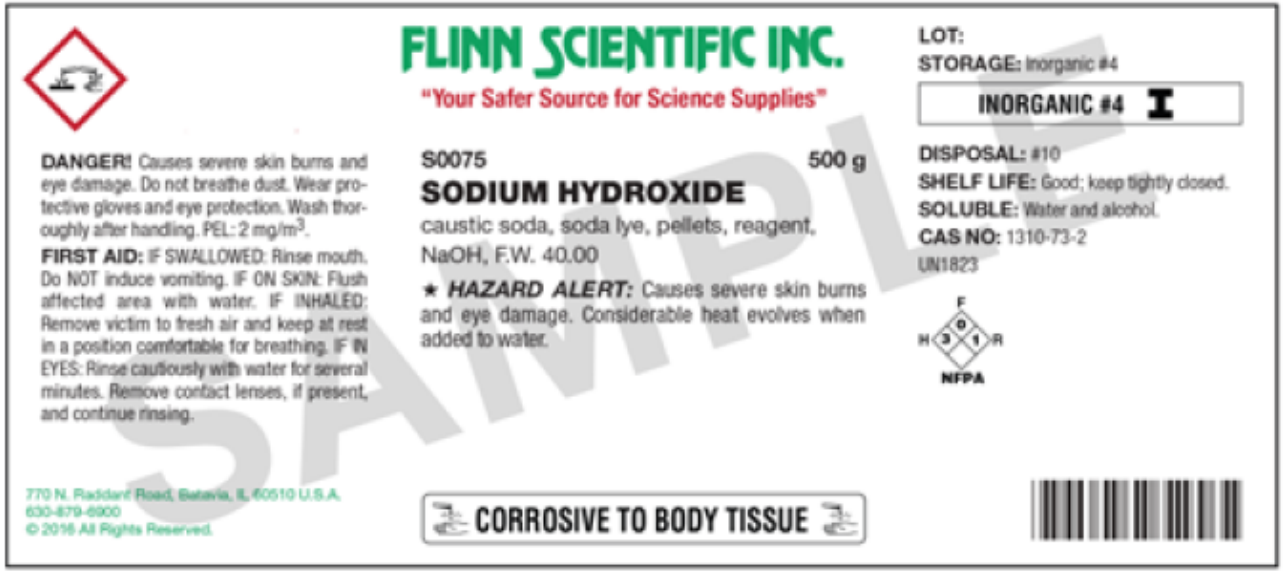
Following these five steps will not only help you comply with your respective state's Right to Know laws, but will also improve the safety in your classroom.

Labelling Requirements

- New bottles of chemicals ordered from trusted suppliers will already have compliant GHS labelling.
- There is a prescribed format for labelling chemicals from the United Nations (GHS) and for updating existing older bottles in your lab.
- Different options exist to retrofit the labels on the bottles

Chemical Product Labels

Always read the label on a chemical bottle to obtain and review basic safety information concerning the properties of a chemical. It is the responsibility of teachers to be fully aware of the hazards and risks of all chemicals they are using.



Labelling Requirements

- Existing bottles of chemicals require a GHS compliant label – 30mL dropper bottles or a 2.5L bottle. **<u>No exemptions</u>!**
- You can create an overlay label and adhere it over the existing supplier label. This is to standardize communication on the chemical labels.
- Solutions made in the lab require a label as well. *Ex Made a 0.1M HCl solution from a 3M stock bottle.* Both vessels require a current GHS label for compliance and adherence to the CHP & OSHA.

DANGER! Flammable liquid and vapor. Causes severe skin burns and eye damage.

Acetic Acid, Glacial
Catalog #: **A0005**
Chemical Grade: **Reagent**
Amount: **250 mL**
Purchased: **03/11/2014**
Family: **O 1**
Disposal: **24a**

Labelling Older Chemicals in the School Prep Area & Storage Cabinets

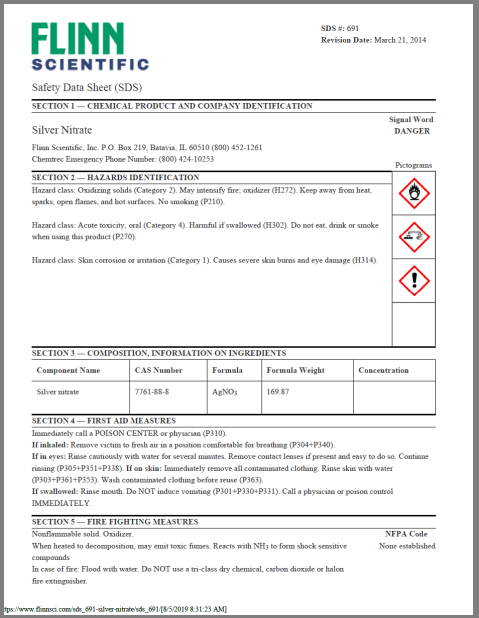
- You must have a current chemical inventory of the products in your lab. **Including OLD chemicals!!!**
- You need to have a GHS label on EVERY Chemical in the lab including dropper bottles and student learning kits. **Period.**
- There is no exemption for small bottles – even dropper bottles should have a proper label with the necessary information printed in color (Red diamond if needed)

SDS

The Safety Data Sheet (SDS), formerly known as the Material Safety Data Sheet (MSDS), is provided by the manufacturer, distributor, or importer of a chemical to provide information about the substance and its use.

The SDS, unlike the MSDS, is required to present the information in a uniform manner. The information includes the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, disposing of, and transporting the chemical. There are 16 sections on every SDS in the same sequence.

The GHS provides standard language or “building blocks” for communicating the hazards of chemicals in the SDS, just as on chemical labels. These “building blocks” include the use of specific signal words, pictograms, hazard statements, and precautionary statements.



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SDS #: 691
Revision Date: March 21, 2014

Safety Data Sheet (SDS)

SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Silver Nitrate

Signal Word
DANGER

Flinn Scientific, Inc. P.O. Box 219, Batavia, IL 60510 (800) 452-1261
Chemtrec Emergency Phone Number: (800) 424-10253

Pictograms

SECTION 2 — HAZARDS IDENTIFICATION

Hazard class: Oxidizing solids (Category 2). May intensify fire; oxidizer (H272). Keep away from heat, sparks, open flames, and hot surfaces. No smoking (P210).

Hazard class: Acute toxicity, oral (Category 4). Harmful if swallowed (H302). Do not eat, drink or smoke when using this product (P270).

Hazard class: Skin corrosion or irritation (Category 1). Causes severe skin burns and eye damage (H314).

SECTION 3 — COMPOSITION, INFORMATION ON INGREDIENTS

Component Name	CAS Number	Formula	Formula Weight	Concentration
Silver nitrate	7761-88-8	$AgNO_3$	169.87	

SECTION 4 — FIRST AID MEASURES

Immediately call a POISON CENTER or physician (P310).
If inhaled: Remove victim to fresh air in a position comfortable for breathing (P304+P340).
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing (P305+P351+P338). **If on skin:** Immediately remove all contaminated clothing. Rinse skin with water (P303+P361+P353). Wash contaminated clothing before reuse (P363).
If swallowed: Rinse mouth. Do NOT induce vomiting (P301+P330+P331). Call a physician or poison control IMMEDIATELY.

SECTION 5 — FIRE FIGHTING MEASURES

Nonflammable solid. Oxidizer.
When heated to decomposition, may emit toxic fumes. Reacts with NH_3 to form shock sensitive compounds
In case of fire: Flood with water. Do NOT use a tri-class dry chemical, carbon dioxide or halon fire extinguisher.

NFPA Code
None established

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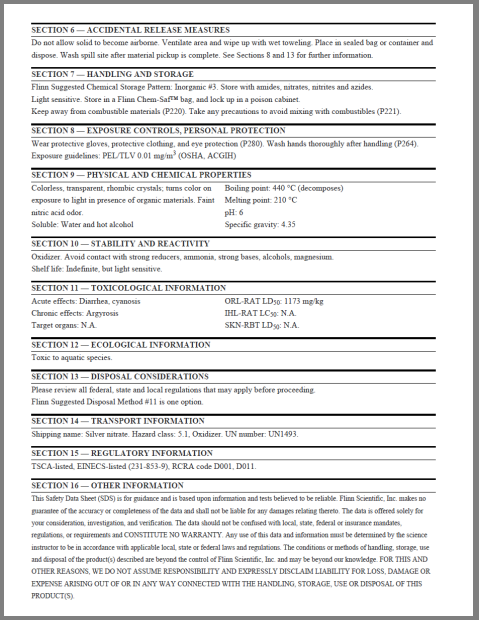


SECTION 6 — ACCIDENTAL RELEASE MEASURES

Do not allow solid to become airborne. Ventilate area and wipe up with wet toweling. Place in sealed bag or container and dispose. Wash spill site after material pickup is complete. See Sections 8 and 13 for further information.

SECTION 7 — HANDLING AND STORAGE

Flinn Suggested Chemical Storage Pattern: Inorganic #3. Store with amides, nitrates, nitrites and azides.
Light sensitive. Store in a Flinn Chem-Saf™ bag, and lock up in a poison cabinet.
Keep away from combustible materials (P220). Take any precautions to avoid mixing with combustibles (P221).

SECTION 8 — EXPOSURE CONTROLS, PERSONAL PROTECTION

Wear protective gloves, protective clothing, and eye protection (P280). Wash hands thoroughly after handling (P264).
Exposure guidelines: PEL/TLV 0.01 mg/m^3 (OSHA, ACGIH)

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Colorless, transparent, rhombic crystals; turns color on exposure to light in presence of organic materials. Faint nitric acid odor.
Soluble: Water and hot alcohol

Boiling point: 440 °C (decomposes)
Melting point: 210 °C
pH: 6
Specific gravity: 4.35

SECTION 10 — STABILITY AND REACTIVITY

Oxidizer. Avoid contact with strong reducers, ammonia, strong bases, alcohols, magnesium.
Shelf life: Indefinite, but light sensitive.

SECTION 11 — TOXICOLOGICAL INFORMATION

Acute effects: Diarrhea, cyanosis
Chronic effects: Argyrosis
Target organs: N.A.

ORL-RAT LD_{50}: 1173 mg/kg
IHL-RAT LC_{50}: N.A.
SKN-RBT LD_{50}: N.A.

SECTION 12 — ECOLOGICAL INFORMATION

Toxic to aquatic species.

SECTION 13 — DISPOSAL CONSIDERATIONS

Please review all federal, state and local regulations that may apply before proceeding.
Flinn Suggested Disposal Method #11 is one option.

SECTION 14 — TRANSPORT INFORMATION

Shipping name: Silver nitrate. Hazard class: 5.1, Oxidizer. UN number: UN1493.

SECTION 15 — REGULATORY INFORMATION

TSCA-listed, EINECS-listed (231-853-9), RCRA code D001, D011.

SECTION 16 — OTHER INFORMATION

This Safety Data Sheet (SDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific, Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. The data should not be confused with local, state, federal or insurance mandates, regulations, or requirements and CONSTITUTE NO WARRANTY. Any use of this data and information must be determined by the science instructor to be in accordance with applicable local, state or federal laws and regulations. The conditions or methods of handling, storage, use and disposal of the product(s) described are beyond the control of Flinn Scientific, Inc. and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THIS PRODUCT(S).

Introducing the GHS Pictograms

Exploding bomb
(for explosion or reactivity hazards)

Flame
(for fire hazards)

Flame over circle
(for oxidizing hazards)

Gas cylinder
(for gases under pressure)

Corrosion
(for corrosive damage to metals, as well as skin, eyes)

Skull and crossbones
(can cause death or toxicity with short exposure to small amt)

Health hazards
(may cause or suspected of causing serious health effects)

Exclamation mark
(may cause less serious health effects or damage ozone layer)

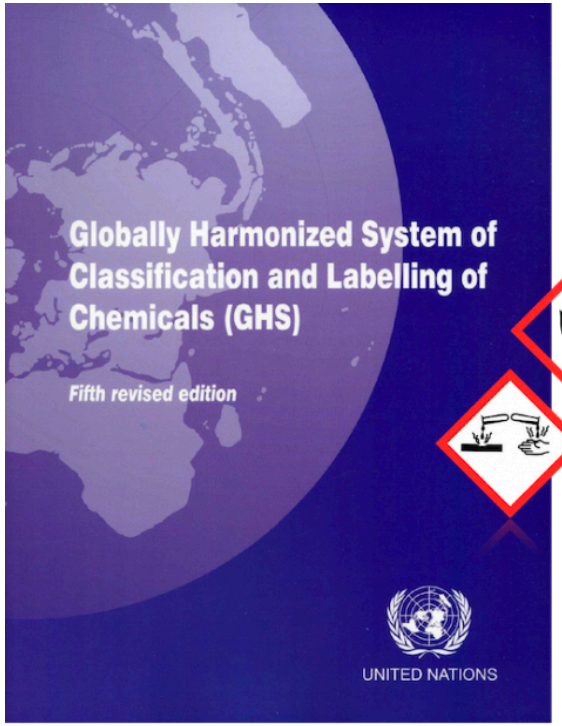
Environment*
(may cause damage to the aquatic environment)

Biohazardous infectious material**
(for organism or toxins that can cause disease)

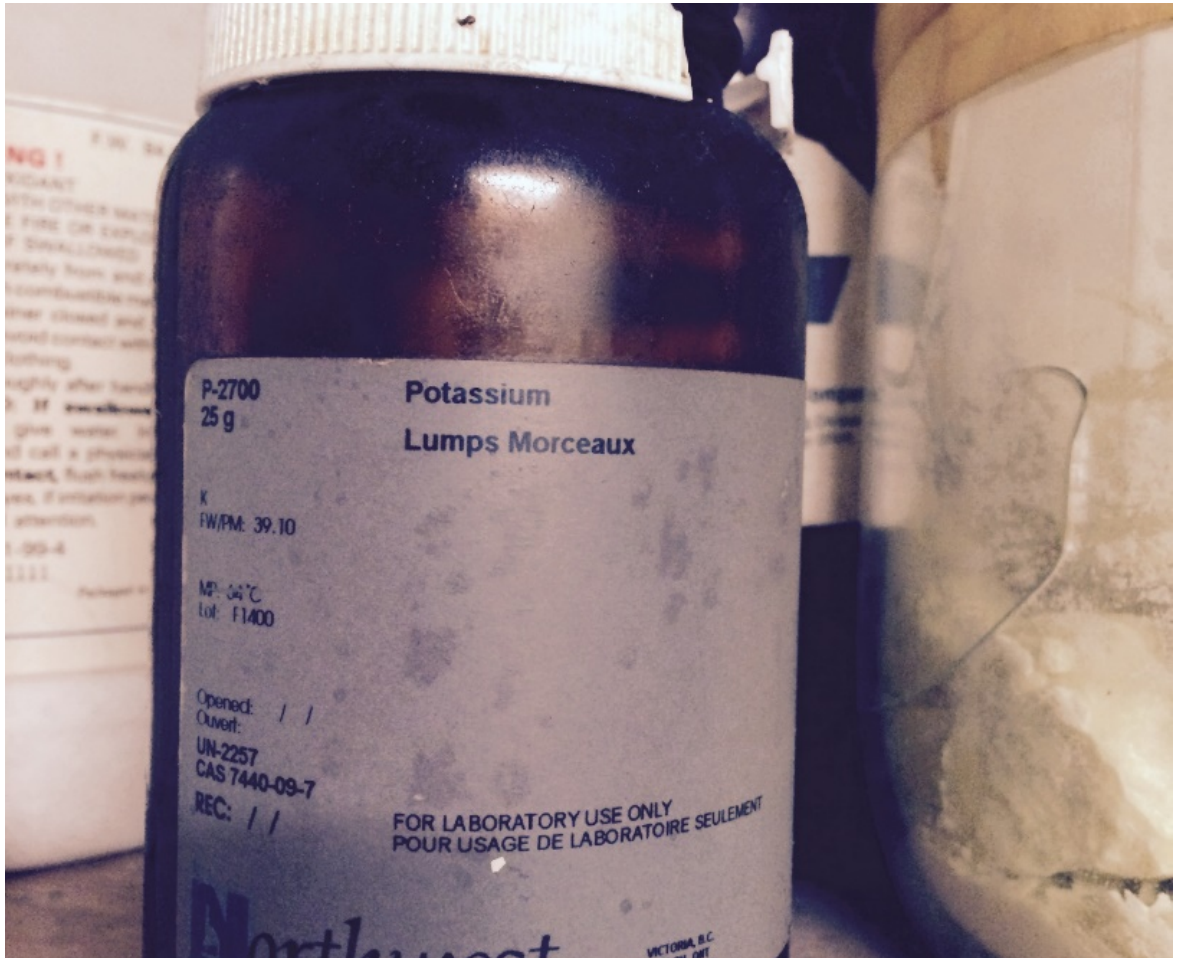
What is GHS?

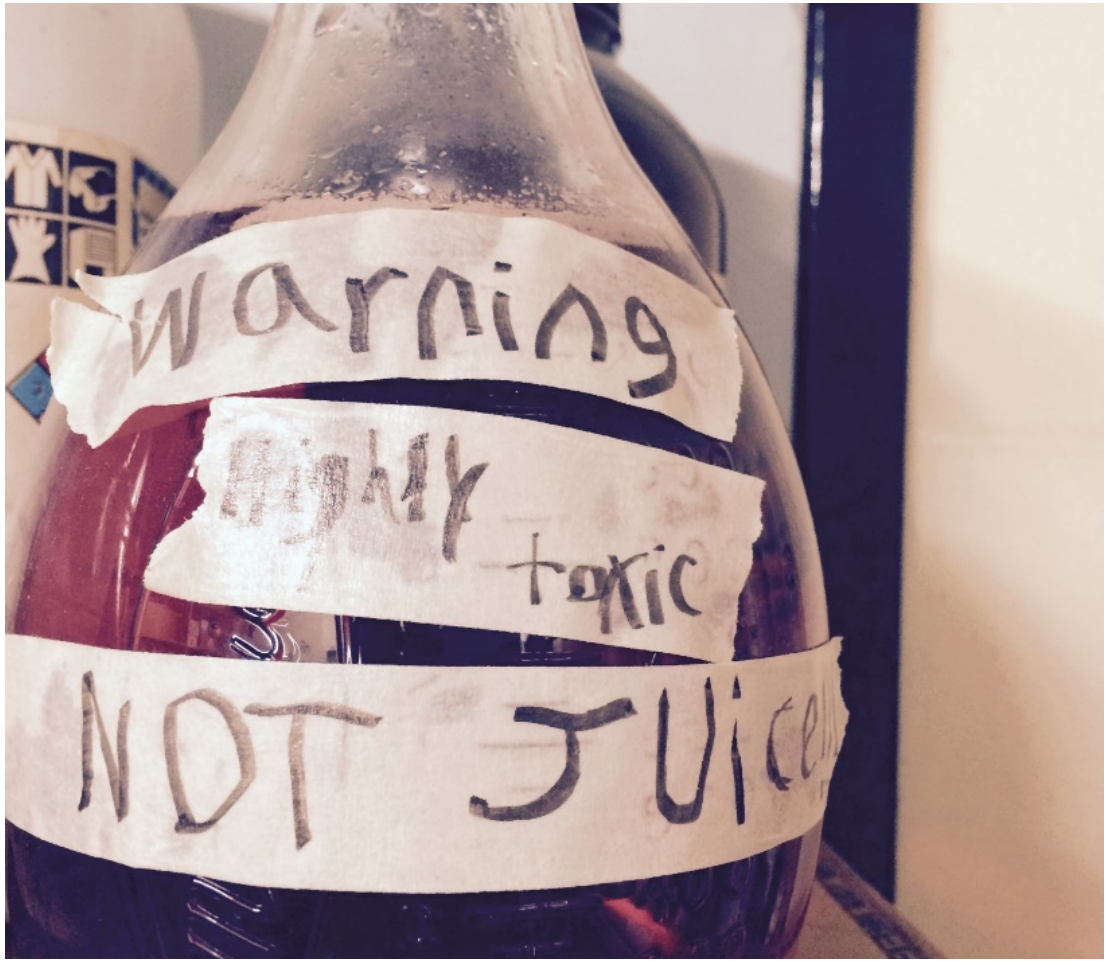
Developed by the United Nations, GHS (Global Harmonized System) :

- Defines and classifies the hazards of chemical products
- Provides health and safety information on labels and Safety Data Sheets (SDS's)
- Goal of GHS:
- That the same set of rules for classifying hazardous products; the same format and content for labels and SDS's, will be adopted and used around the world



This is 100% legit. Found in a high school nearby……..





ORPHAN CHEMICALS

What in the world is that dark liquid in the flask?

- Unknown #1
- Reagent “B”
- DO NOT USE!
- “Pour your Used Chemicals in Here”
- &^%$@#* 90%

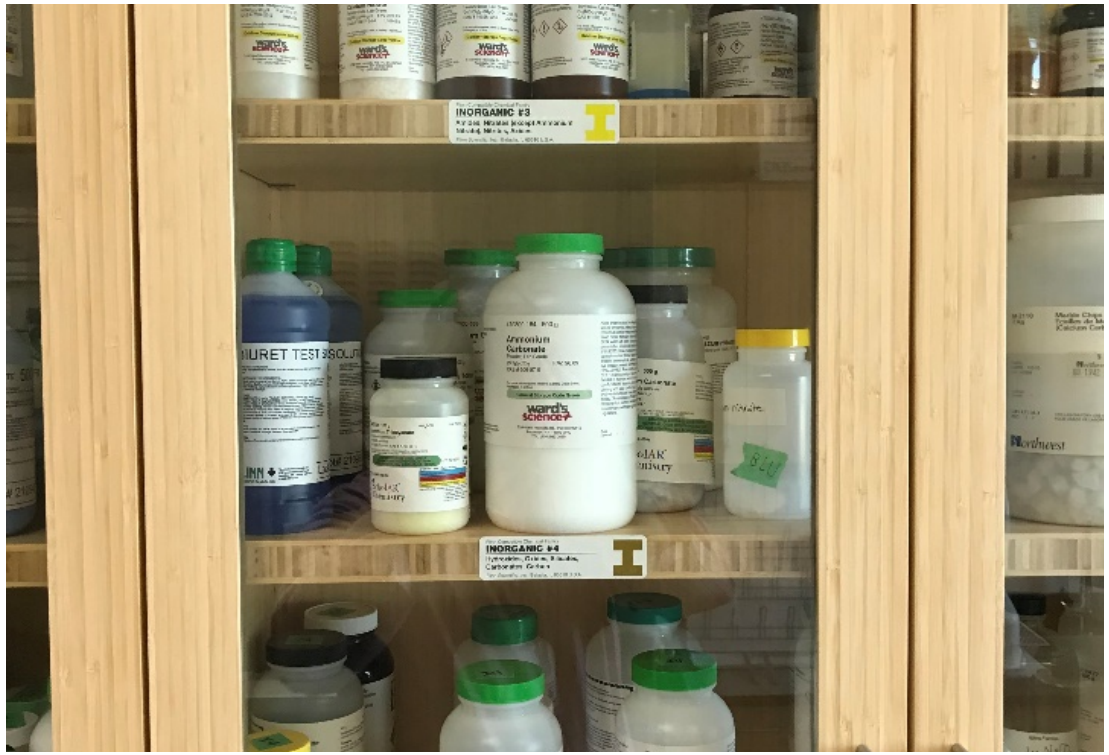
Does this look like a safe practice for your chemical storage?

This is absolutely not a photoshop image..

Both a scary and 100% preventable issue.

Organized. Labelled. Compliant.

This is the ‘gold standard’ for chemical storage and GHS labelling compliance that you should aim towards in your facility.



Personal Protective Equipment

- ANSI Z87.1 certified goggles (chemical splash/impact resistant)
- Gloves (based on 8-hour exposure immersed in chemical)
- Aprons / Lab Coats --- Teacher and Student?
- Face Shield
- Ear protection
- Respirator – fitted properly & replacement cartridges

Engineering Control / Preventions

- Fume Hood
- Eyewash
- Drench Shower
- Chemical Safety Cabinets
- Chemical Spill Kit

Fire Safety

- Fire Extinguisher – type / location / PASS / training (local FD involvement)
- Fire Blanket – location / type / training
- Fire Detection – smoke alarm in lab / prep area (NFPA rules)
- Fire Alarm – location / functional
- Fire Suppression System – sprinkler vs powder vs carbon dioxide
- Emergency Signage posted and practice drills documented

Employee Training Program

Have the teachers been trained in the following areas?

- Chemical labelling (GHS) and SDS management
- Chemical storage (compatibility issues / space / location..)
- Chemical handling & dispensing techniques (solution dilution)
- Chemical disposal process and storage of hazardous wastes
- Chemical spills (acid / base / solvent)
- Fire / Flood / Broken Glass / Accidental Injury /
- CHP Review and Updating annually – including administration
- First Aid
- Fire Extinguisher & Fire Blanket Safe and Proper Use
- Identifying hazards and prevention

Best Practices in the Science Department

Being consistent is critical to the on-going safety and success in the school science department.

- Current inventory of chemicals on-site and a manageable effective storage system
- All chemicals labelled according to GHS
- Organized lab areas – no clutter or leftover lab activities for weeks
- Safety training and compliance for ALL employees

Best Practices Continued…

- Always use (model) PPE when in the lab
- Use of a Lab Safety Contract with students to reinforce behavior.
- Follow procedures from the CHP / school district safety manual / DOE policy documents
- Ordering chemicals in smaller amounts in the lowest concentration possible to minimize storage and disposal

FLINN SCIENTIFIC Chemical Storage Pattern

Organic Storage Codes

- O1 – Acids, Amino Acids, Anhydrides, Peracids
- O2 – Alcohols, Glycols, Sugars, Amines, Amides, Imines, Imides
- O3 – Hydrocarbons, Esters, Aldehydes, Oils
- O4 – Ethers, Ketones, Ketenes, Halogenated Hydrocarbons, Ethylene Oxide
- O5 – Epoxy Compounds, Isocyanates
- O6 – Peroxides, Hydroperoxides, Azides
- O7 – Sulfides, Polysulfides, Sulfoxides, Nitriles
- O8 – Phenols, Cresols
- O9 – Dyes, Stains, Indicators
- OM – Organic Miscellaneous

Inorganic Storage Codes

- I1 – Metals, Hydrides
- I2 – Acetates, Halides, Iodides, Sulfates, Sulfites, Thiosulfates, Phosphates, Halogens
- I3 – Amides, Nitrates (except Ammonium Nitrate, store as I8), Nitrites, Azides
- I4 – Hydroxides, Oxides, Silicates, Carbonates, Carbon
- I5 – Sulfides, Selenides, Phosphides, Carbides, Nitrides
- I6 – Chlorates, Bromates, Iodates, Chlorites, Hypochlorites, Perchlorates, Perchloric Acid, Peroxides, Hydrogen Peroxide
- I7 – Arsenates, Cyanides, Cyanates
- I8 – Borates, Chromates, Manganates, Permanganates
- I9 – Acids (except Nitric) (Nitric Acid is isolated and stored by itself.)
- I10 – Sulfur, Phosphorus, Arsenic, Phosphorous Pentoxide
- IM – Inorganic Miscellaneous

Chemical Families and Corresponding Storage Codes

Acetates — I2
Acids, Inorganic (except Nitric) — I9
(Nitric Acid is isolated and stored by itself.)
Acids, Organic — O1
Alcohols — O2
Aldehydes — O3
Amides (inorganic) — I3
Amides (organic) — O2
Amines — O2
Amino Acids — O1
Anhydrides — O1
Arsenates — I7
Arsenic — I10
Azides (inorganic) — I3
Azides (organic) — O6
Borates — I8
Bromates — I6
Carbides — I5
Carbon — I4
Carbonates — I4
Chlorates — I6
Chlorites — I6
Chromates — I8
Cresols — O8
Cyanates — I7
Cyanides — I7
Dyes — O9
Epoxy Compounds — O5
Esters — O3
Ethers — O4
Ethylene Oxide — O4
Glycols — O2
Halides — I2
Halogenated Hydrocarbons — O4
Halogens — I2
Hydrides — I1
Hydrocarbons — O3
Hydrogen Peroxide — I6
Hydroperoxides — O6
Hydroxides — I4
Hypochlorites — I6
Imides — O2
Imines — O2
Indicators — O9
Iodates — I6
Iodides — I2
Isocyanates — O5
Ketenes — O4
Ketones — O4
Manganates — I8
Metals — I1
Miscellaneous (inorganic) — IM
Miscellaneous (organic) — OM
Nitrates — I3
(except Ammonium Nitrate, store as I8)
Nitrides — I5
Nitriles — O7
Nitrites — I3
Oils — O3
Oxides — I4
Peracids — O1
Perchlorates — I6
Perchloric Acid — I6
Permanganates — I8
Peroxides (inorganic) — I6
Peroxides (organic) — O6
Phenols — O8
Phosphates — I2
Phosphides — I5
Phosphorus — I10
Phosphorous Pentoxide — I10
Polysulfides — O7
Selenides — I5
Silicates — I4
Stains — O9
Sugars — O2
Sulfates — I2
Sulfides (inorganic) — I5
Sulfides (organic) — O7
Sulfites — I2
Sulfoxides — O7
Sulfur — I10
Thiosulfates — I2

"Your Safer Source for Chemicals"

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AP6196

Storing your chemicals properly takes some time to set-up initially but is very simple to maintain going forward.

Common Concerns about Safety Regulatory Compliance

- Do we have the ‘right’ chemical storage cabinets?
- Do we have hazardous chemicals? (risk exceeds value)
- Do we have an accurate inventory?
- Do we have GHS labels on the chemicals?
- Do we have a Chemical Hygiene Plan in place? How current?
- Do we have a Chemical Hygiene Officer? Who is it?
- Do we have the necessary PPE? (Goggles / respirator / gloves etc.)
- Do we have a functional fume hood / eyewash / shower?
- Do we have an ongoing safety training program for employees?
- Do we have a Banned list of chemicals / activities that is communicated?

Compliance Concerns Continued…

- How do we make a Chemical Hygiene Plan?
- Who will be the Chemical Hygiene Officer?
- How do we label ALL of our chemicals for GHS compliance?
- How do we create an accurate inventory of our chemicals & SDS?
- How do we inspect PPE? (Goggles / respirator / gloves etc.)
- How do we inspect our fume hood / eyewash / shower?
- How do we engage in an ongoing safety training program for employees?
- How do we create Banned list of chemicals / activities?
- How much is this going to cost?
- How long does this laboratory safety compliance take to implement?
- How do we start the process?

OSHA Checklist for Compliance with the Laboratory Standard

Lab Standard Checklist

This is a great walk-through to identify your needs in the school.

Simple Yes/No format will allow for focus on areas of concern and forms a plan for continual improvement in the culture of safety in the school and across the school district.

CHECKLIST FOR COMPLIANCE WITH
OSHA LABORATORY STANDARD (CHEMICAL HYGIENE)

Item	Y	N
1. Population Identification a. A criterion is established to determine employees that need Laboratory Standard training? *[The "New Employee/Guest Orientation" form may be one method of compliance].*		
b. Use of chemicals in the laboratory is limited to non-production, small-scale operations. *[For additional guidance, see http://www.osha-slc.gov:80/OshDoc/Interp_data/I19910208.html, Letter of OSHA interpretation regarding difference between lab and hazard communication, and http://www.osha-slc.gov:80/OshStd_data/1910_1450.html for the OSHA definition of "lab scale."]* *Note: Projects at production scale or involving routine tasks are covered under the Hazard Communication Standard.*		
c. All laboratory experiments are reviewed for environmental, safety and health problems? *[ESH Standard 1.3.5 Experimental Reviews are an ideal mechanism to conduct these hazard determinations.]*		
2. Training for identified populations a. Workers have received Laboratory Standard (Chemical Hygiene) Training (IND 220) *[Retraining every two years is recommended. The audit criteria will be a current understanding of the Lab Standard program and chemical safety by the employee.]*		
b. The audit criterion for training is "Performance Based" knowledge of chemical safety. (i.e. Employees can demonstrate chemical and laboratory procedure safety knowledge.) Can Employees provide answers in the following areas? Knowledge of the existence of the Laboratory Chemical Hygiene Plan *[i.e. ES&H Standard 2.2.1]* and familiarity with the content of the plan. Knowledge of departmental laboratory chemical hygiene plans Knowledge of how to select and use protective equipment and clothing (PPE). Understanding of the limitations of PPE use. Knowledge of how to determine if a hazardous chemical release has occurred in the area. Knowledge of how to obtain assistance to evaluate potential chemical exposures by involving the Occupational Medicine Clinic and the Safety & Health Services Division.		
c. Workers are informed of safety requirements when new hazards are introduced into the workplace.		
3. Hazard Recognition and Control a. A review is conducted by the supervisor (or cognizant individual) before the use of chemicals to determine the appropriate protective measures.		
b. Workers follow appropriate protective measures established by their supervisor. 1. Hoods, vents or other engineering controls are used as necessary.		
2. Gloves, respirators, protective clothing, and other PPE are used as necessary. PPE is cleaned and stored properly.		

Flinn Scientific Checklist for Lab Safety 101

CRITERIA	YES	NO
1. Do you have only ‘new’ chemicals in the lab? (less than 3 years old)		
2. Is there a current chemical inventory? Are the new SDS’s accessible to all?		
3. Are chemicals labelled and stored properly? (GHS labels & organized safely)		
4. Is there adequate PPE in the lab? (goggles/gloves/aprons etc.)		
5. Are there proper chemical storage cabinets? (acid, corrosive, flammables cabinets)		
6. Are teachers properly trained in safety protocols and procedures? (recertification?)		
7. Is a Safety Contract used with students in the lab?		
8. Is there adequate fire safety equipment in each room? (extinguisher / blanket etc.)		
9. Is there a current Chemical Hygiene Plan in place? Is there a CHO designated?		
10. Is there a hazardous waste procedure in place / scheduled pick-up for disposal?		
11. Is there a Banned/Restricted list of chemicals?		
12. Do you feel comfortable with the accountability for safety in the science department?		

Chemical Hygiene Plan

Flinn Scientific has a Chemical Hygiene Plan template that you can use. It is the most widely referenced CHP and will save you time in developing your own version as well as accelerate the culture of safety awareness in your school.

Contact Flinn today for your free copy!

Flinn Certified Lab Safety Course (On-line)

You can participate in the Award-Winning Lab Safety Certification from Flinn (On-Line and FREE)

8 hour modular course covering every topic in the science lab in a practical and direct way.

You must pass each unit before proceeding (there are built-in evaluations to ensure knowledge transfer) and grow your safety awareness level

Certificate of Completion provided and Re-certification course available as well. High School and Middle School versions are available.

https://labsafety.flinnsci.com/app/

Your Path Forward begins now. Right now.
Use this as your guide towards 100% compliance.

Adopt the chemical hygiene plan you were provided by FLINN.

→

Designate a chemical hygiene officer

→

Make a chemical inventory of the chemicals in the school(s) including new SDS and GHS labels on existing chemicals.

→

Identify any areas of concern in the schools including purging old or hazardous chemicals, PPE, & safety infrastructure needs.

↓

Participate in an on-going safety program. This can include the online flinn safety certification / re-certification program.

→

Document all conversations and activities to demonstrate a linear progression towards increased safety and awareness.

→

Contact FLINN for your specific safety needs

FLINN

Science Catalog & Reference Manual

2020

Resources to Help you:

Contact us for a complimentary Flinn Scientific Chemical Hygiene Plan (CHP) template to use to kick-start your culture of lab safety and awareness or a ‘Test-Drive’ of the Chemventory software that manages inventory, prints GHS labels and catalogs the SDS’s.

The ‘Yellow Pages’ at the back of each Flinn catalog and Reference Manual are loaded with safety resources and are provided to each of your teachers and schools for FREE. We have also put these safety resources online for you to use as required. You can call us for technical support and a Flinn scientist / resident expert will help!

References for your review

- https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-osha-lab-standard.pdf
- https://www.flinnsci.com/fire-safety-inspection/dc10454/
- https://www.flinnsci.com/api/library/Download/d2bdf6cbd2194bc4a2808269adffc1e5
- https://www.acs.org/content/acs/en/education/policies/safety.html
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- https://www.flinnsci.com/resources/safety-reference/
- https://pnwboces.org/pdf/safety/2016-Nov-Newsletter.aspx
- https://www.nsela.org/assets/SaferScience/science%20teacher%20safety%20training_%20mandatory%20for%20employer.pdf

FLINN SCIENTIFIC

Ask about our custom district solutions designed to support a safe return to school:

- Custom safety and professional development/learning proposals to ensure full school safety
- Full PPE for students, faculty, and support staff
- Blended science learning solutions that provide continuity of lab instruction for both onsite & remote learners

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