Introduction

The purpose of the Science Lab Safety and Chemical Hygiene Plan:

- Protect employees & students from health hazards associated with hazardous chemicals in the laboratory.
- Keep chemical exposures below established permissible exposure limits. Consult Safety Data Sheets (SDS) for specifics.

The Chemical Hygiene Plan will be readily available to employees. The school district shall review and evaluate the effectiveness of the Chemical Hygiene Plan at least annually and update it by October 1st of each school year.

I) District and School Responsibilities

The district will provide training to the designated School Chemical Hygiene Officer, who will in turn train staff members at their school.

1) Schools will record all employee exposures to hazardous chemicals:
   a) Forward copies of these records, including all employee exposure and medical records to the district Risk Management office.
2) Schools (chemical hygiene officer) will train employees to:
   a) Understand the hazards of chemicals they use in the laboratory.
   b) Properly use personal protective equipment (fume hoods, goggles, etc.)
   c) Protect themselves from chemical exposure by following good lab procedures.
   d) Understand the content of the Chemical Hygiene Plan.
3) Schools will provide access to all employees of:
   a) Safety Data Sheets (SDS).
   b) The Lab Safety and Chemical Hygiene Plan.
   c) Schools must provide all safety equipment required on SDS (if SDS requirements cannot be met by the school, the chemical cannot be used/kept at the school).
4) Schools will ensure information related to safe storage, disposal, clean-up, etc. is available by:
   a) Compiling SDS for all chemicals stored and/or used by the science department; SDS files can be physical or electronic, but must be readily accessible.
   b) Making sure chemical labels include the following information:

      1. Chemical name.
      2. Hazard information.
      3. Name and address of the manufacturer.

      Note: You must follow these steps for all chemicals and chemical solutions made and stored in your laboratory or chemical storeroom.

II) Standard Operating Procedures

General Employee Rules and Procedures

1. Minimize all chemical exposures.
2. Skin contact with chemicals should be avoided.
3. Post safety rules and chemical hazard signs for storage rooms.
4. Wear appropriate eye protection at all times.
5. Flammable liquids require special attention. Never use these materials near any source of ignition, spark or open flame.
6. Never perform a first-time chemical demonstration in front of your class. Always perform first-time demonstrations in front of other instructors to evaluate the safety of the demonstration.
7. Never store chemicals over, under or near a sink.
8. Only authorized personnel should be allowed in the chemical storeroom.
9. All employees must receive training on how to use all safety devices in the laboratory (e.g., eyewash, fire extinguisher, etc.), and teach all students and employees to find the safety devices quickly in an emergency.
10. Employees will know where and how to use master utility controls to shut off gas, electrical and water supplies.
11. Never taste chemicals. If smelling chemicals is necessary, use the wafting technique to protect mucous membranes and lungs.
12. Do not apply cosmetics, eat, chew gum, or drink in the laboratory.
13. Do not pipette by mouth-always use a pipette bulb or appropriate suction device.
14. Wash thoroughly after any chemical exposure or before leaving the laboratory.
15. Use a safety shield whenever an explosion or implosion might occur.
16. Know how to properly store all chemicals in their compatible chemical families.
17. Know the proper transportation and disposal procedures for chemicals.
    a. Follow SDS guidelines.
    b. For unknown materials or chemicals that you no longer use, have your custodian put in a work order to the compliance department. Contact Suzette Boland (slboland@graniteschools.org) if you have questions or need help with this.
18. Annual training review by the School Chemical Hygiene Officer is required for each science teacher. Appropriate documentation of in-service should be kept on file. See *Appendix B.*

Chemical Purchases

1. Only the amount of chemical that could reasonably be used during a school year should be ordered (use of small scale labs is recommended).
2. New chemical purchases must be added to the school chemical inventory and SDS added to school records.
3. Proper storage and safety equipment (according to the SDS) must be available at the school for any chemical purchases. If a school does not have the proper storage facilities or safety equipment for a particular chemical, the chemical may not be purchased.
4. Chemicals should be purchased from known, reliable chemical supply houses.
5. Donations of chemicals are not allowed without approval from the District Risk Management. (This includes universities, commercial labs, law enforcement, private companies, mining facilities etc.).

Chemical Storage

1. Only authorized adult personnel are allowed in the chemical storage area. Students should never be allowed in this area.
2. All products must be clearly labeled (see I.4.b).
3. Do not purchase or use chemicals unless proper understanding of storage and use is known.
4. Chemical inventory must be kept up to date.
5. Establish a secure storage area for chemicals. Chemical storage containers must have locks and be kept locked.
6. Science teachers should transport shipments of chemicals from office to lab (not a student or secretary).
7. Store corrosives in appropriate corrosive cabinets.
8. Store flammables in appropriate flammable cabinets with self-closing doors. If your cabinets do not have self-closing doors, put in a work order.
9. Avoid storing chemicals on shelves above eye level. Shelves should be equipped with lips or wire across the opening to prevent containers from rolling off.
10. The storage area and cabinets must be labeled as to identify the hazardous nature of the products stored within. This will allow fire department officials to quickly see a potentially hazardous area.
11. Chemicals should not be stored on the floor except in approved shipping containers.
12. Never store food in a laboratory refrigerator.

Chemical Disposal

1. Dispose of all chemicals properly. All disposal procedures used should conform to state and local regulations.
2. Follow SDS guidelines.
3. If you are unfamiliar with disposal guidelines, have your custodian put in a work order to environmental safety for disposal. Contact Suzette Boland (slboland@graniteschools.org) if you have questions or need help with this.

Specimen Disposal

1. Microorganisms: Petri dishes, gloves & cultures should be autoclaved or flooded in a 10% bleach solution overnight before disposing in trash.
2. Dissection specimens: If packed in CaroSafe, specimens can be soaked in water overnight, drained and disposed of in the trash. For specimens packed in other solutions, consult the SDS before purchasing to ensure proper disposal will be possible. Specimens in formaldehyde are not permitted in classrooms.
3. Fresh specimens (non-preserved) can be disposed of in the trash.

Heat Sources

1. Alcohol burners are not allowed in any GSD classroom.
2. Bunsen burners are only allowed in science laboratories with built-in gas lines.
3. No heat source should be used near combustibles such as chemicals, papers, furniture, etc.
4. Consult with custodial staff to determine if electrical circuits are adequate for the number of heat sources needed, or if limits on heat sources need to be imposed.

5. Hot plates for heating water or other chemical solutions should be inspected for frayed cords or damaged components. Any damaged units should be disposed of. Store securely when not in use.
6. Use only heat-resistant borosilicate glassware on hotplates, and check for cracks before use.
7. **Elementary classroom heat sources**: There is a need for heat sources (i.e. microwaves, hotplates) in the elementary science core. Since there are no designated labs in most elementary buildings, additional safety precautions must be taken to mitigate risk to personnel, students and property. For those few lessons (mainly 4^{th}-6^{th} grade):
   A) Teachers must inform their administrators and custodian prior to the experiment that heat sources will be used including the date and time.
   B) Only an adult in the classroom may use the hotplate.
   C) A fire extinguisher must be in the classroom with the heat source during the science lesson as part of a "fire watch."
   D) Hotplates must be stored in a secure location in the main office (storage closet, file cabinet etc…) and checked out by the teacher for the day of lab and must be returned to the office at the end of the lab activity.
   E) The portable fire extinguisher on "fire watch" must also be returned to its storage location at the end of the lab activity.

Fire

1. Have appropriate types and sizes of fire extinguishers in science labs.
2. Do not block fire exits.
3. Fire extinguishers should not be blocked at any time.

Electrical

1. Outlets within 6 feet of sinks should be GFCI.
2. Only heavy duty extension cords should be used.

Spills

1. Consult SDS for proper safety equipment and spill clean-up materials.
2. Clean up spills immediately and thoroughly. Follow approved spill cleanup procedures; spills should only be cleaned up by approved personnel. Check with your custodian to find out who is approved to clean up different chemicals.

Housekeeping Rules

1. Do not use chipped, etched or cracked glassware. Glassware that is chipped or scratched presents a serious breakage hazard when heated or handled.
2. Do not pour reagents back into stock bottles.
3. Sharps/broken glassware should be disposed of in a bucket with a lid or cardboard box sealed up to reduce risk of tearing garbage liner. Label container *Bio-Hazard* and properly dispose if contaminated with a chemical.

4. Store chemicals in the chemical prep and storage area. If chemicals are moved to the classroom for a lab, they must be returned to their proper storage location at the end of the day's laboratory periods.
5. Waste materials require proper containers and labels.
6. Do not store items in the fume hood.
7. Work and floor surfaces should be cleaned regularly and kept free of clutter.

Compressed Gas Rules

1. Propane tanks are not permitted inside the classroom.
2. Compressed gases (e.g. oxygen, carbon dioxide) should be handled as high-energy sources, and therefore, as potential explosives.
3. Gas cylinders must be secured in place by cylinder clamps to the table or by chaining the tank to the wall. They must be protected to prevent valve damage, which may be caused by falling.

Guidelines for Extremely Hazardous Chemicals

1. See *Appendix A* for an abbreviated list of substances not permitted in GSD schools. You can search the risk.utah.gov/school-chemical-list site to search for individual chemicals, or see the full list of restricted/prohibited chemicals here.
2. Use a fume hood when the permissible exposure limit for a chemical is less than 50 ppm as indicated on the chemical SDS.
3. Carcinogens, mutagens, and teratogens are not permitted in schools.
4. Handle toxic, corrosive, flammable and noxious chemicals under a fume hood.
5. Do not expose flammable liquids to open flame, sparks, heat or any source of ignition.

Guidelines for Animals in the Classroom

1. Provide alternatives to dissection for students who request it.
2. Obtain parental consent for dissections (or include in disclosure statement).
3. Dissection specimens or other biotic material should be purchased from commercial science supply sources.
4. Animals brought in for observation should be handled humanely. Some animals are not permitted in the classroom such as:
    a. Wild animals, or organisms collected from the wild
    b. Poisonous animals
    c. Aggressive animals
    d. Stray animals
5. Chicks/ducks/reptiles/amphibians require special handling to avoid salmonella.
6. Chick hatching is strongly discouraged, and requires administrative approval. A plan for what to do with chicks hatched in the classroom must be in place before the activity begins.
7. No animals raised in the classroom can be released into the wild (exception: butterflies).
8. No experiments on live vertebrate animals are permitted in school.

Human Tissues/Fluids

1. For safety reasons, human blood and tissues may not be used in the science classroom, except in the following cases:
    a. Human hair, and properly collected cheek cells
    b. Specialized health science and technology courses (CTE) have a separate set of guidelines for human tissues/fluids.

III) General Laboratory Safety Guidelines

Emergencies & Emergency Equipment

1. In the event of an accident, evacuate and contact the school's first responder and appropriate administrator. Make sure everyone in the department knows who the first responder is. If you don't know who your school's first responder is, check with your administration.
2. Practice emergency evacuation. Have an alternative evacuation route in the event your primary route becomes blocked.
3. Emergency telephone numbers are posted in the chemical stores area. Have a telephone or some means of emergency communication in the laboratory, chemical storage area and prep area or classroom.
4. All labs must have an eyewash capable of treating both eyes continuously for 15 minutes with copious quantities of potable water. Teach everyone how to use the eyewash quickly in case of an emergency. A yellow maintenance record card must be attached to each eyewash. Eyewashes must be tested monthly, and the testing dates recorded on the card.
5. Safety showers or body drenches should be provided for junior and senior highs. Showers must be tested monthly, and the testing dates recorded on the attached yellow maintenance record card. Use a 5-gallon bucket for testing showers.
6. Keep access to emergency equipment clear at all times.

Personal Protective Gear

1. Eye protection must be worn, and classroom goggles must be sanitized before they are used by other students. If your school does not have goggle sanitizer cabinets, goggles can be sanitized using disinfectant wipes, or by hand washing or running through a dishwasher.
2. Wear gloves that offer protection for all hazards you may find in the lab. Test for holes every time you wear your gloves.
3. Wear a full-length lab coat or a chemical-resistant apron when working with chemicals.
4. Wear sensible shoes and clothing (no shorts, open toed or loose hanging clothes).

IV) Safety Equipment Inspection

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

- Eye washes/drench showers - tested monthly and recorded on yellow tag
- Fire extinguishers - inspected annually by fire marshall
- Goggles - clean and free from scratches

- Respirators - clean and properly stored. Note: *OSHA requires fit tests and medical tests if a respirator is used, so it is not recommended that any GSD school use chemicals whose SDS requires the use of a respirator. If a chemical requires a respirator, contact Risk Management for approval.*
- Fume hoods - check monthly anemometer for 60-100fpm air flow
- Gas shut-off valves - checked that they turn easily.

All safety equipment in the facility must always be in good operating condition. This statement applies to all safety equipment, required or recommended.

V) Employee Training

1. All secondary science teachers are required to complete a yearly Vector training on science lab safety procedures and expectations. If teachers have questions or concerns about these procedures, they should contact the Secondary Science Specialist for support.
2. Each school must create and maintain a written Hazard Communication Plan. (see Appendix C).
3. Each school must designate a Chemical Hygiene Officer annually. This person is responsible for delegating safety responsibilities and submitting the Checklist for Compliance (see Appendix B) and the Hazard Communication Plan (see Appendix C) using the provided form. [Insert link to form here]

VI) Student Training and Safety

<u>Safety Training for Students</u>

1. Classroom instructors should give lab safety instructions to students each year.
2. GSD recommends that a safety clause be included in all secondary science class disclosures, and obtain a signature from parents if possible. An example statement is available in Appendix D.
3. GSD recommends that a Safety Quiz on the class lab guidelines and expectations be given to students and then kept on file.
4. Specific safety protocols should be taught prior to individual labs, and teachers should enforce safe practices.

<u>Safety Guidelines for Students</u>

1. Eye protection must be worn when working with chemicals.
2. Wear gloves that offer protection for all hazards you may find in the lab. Test for holes every time you wear your gloves.
3. Students should wear clothing appropriate for working with chemicals. Consider providing lab coats or other protective clothing for students on lab days. Students should be instructed on hazards of wearing shorts, open toed shoes, loose hanging clothes, etc. when working in the lab.
4. Students should not eat or drink in the lab, and should not taste or smell chemicals, except in the following situations:
    a. If smelling chemicals is necessary, students should be instructed on how to waft to protect their mucous membranes and lungs.
    b. Tasting chemicals during an activity may sometimes be appropriate. If possible, these activities should be done in a classroom and not in a lab space. When tasting

chemicals is appropriate, regular lab equipment cannot be used for any part of the activity. Disposable containers, such as paper cups, plastic spoons, etc. should be used. These items should be discarded when the students complete the activity and not reused by other students. Only food-grade chemicals may be used.

5. Students should wash hands with soap and water after working with chemicals, rock samples, or other materials.
6. Students should not apply cosmetics, eat, chew gum, or drink in the laboratory.
7. Students should be trained in the proper use of all lab equipment.
8. Students should be trained in emergency procedures, including use of the eye wash, shower, location of the fire blanket, exits, etc.

Appendix A: Banned Substances

The State Office of Risk Management

This is not a comprehensive list of all explosive and dangerous chemicals. To see the complete list, search the Utah Division of Risk Management's School Chemicals page.

The substances in this table are not permitted for use or storage in schools and should be disposed of immediately. If you have any of these chemicals in your inventory, contact Risk Management and/or Suzette Boland (slboland@graniteschools.org) to have them removed.

Explosive Chemicals

Carbon disulfide
Benzoyl peroxide
Diisopropyl ether
Nitrogen triiodide
Percholoric acid
Picric acid
Sodium azide

Carcinogens & extremely hazardous chemicals:

Cadmium salts
Mercury
Nicotine
Paradichlorobenzene
Phenol (carbolic acid)
Toluene
Xylene
2-Acetylaminoflourine
4-Aminodiphenyl
Aniline
Antimony oxide
Arsenic powder
Arsenic compound
Asbestos
Benzen
Barium peroxide
Benzidine (and salts)
Beryllium carbonate
Cadmium powder
Carbon tetrachloride
Chloroform
Cobalt powder
Chromium (VI) oxide
3, 3-Dichlorobenzidene (& salts)
Dimethyl amine
4-Dimethlyaminoazobenzene
Dioxane
Ethylene dichloride
Ethyleneimine
Ethylene oxide
Hydrazine (anhydrous)
Hydrofluoric acid
Lead arsenate
Methylchloromethyl ether
4-4 Methylene bis (2-chloroaniline)
Methylene chloride
Osmiumtetraoxide
Alpha-naphtylamine
Beta-naphtylamine
Nickel powder
4-Ntrobiphenyl
Beta-propiolacetone
Phosphorus (yellow, white, or red)
Sodium metal (chunks larger than 0.5 grams)
Sodium arsenate
Sodium arsenite
Vinyl chloride
Acrylonitrile
0-toluidine
Ammonium dichromate
Chromic acid
Formaldehyde

Appendix B: Checklist for Compliance

To be filled out by the School Chemical Hygiene Officer at each school and returned to the District Secondary Science Specialist annually.

School:_____ Chemical Hygiene Officer:_____

Initial each line:

Obtained copy of the Chemical Hygiene Plan	_____	Obtained SDS for each chemical	_____
Read and understood the requirements	_____	Prepared written Hazard Communication Plan	_____
Assigned responsibility for tasks	_____	Made SDS available to workers	_____
Completed an inventory of chemicals	_____	Established procedures to maintain current program	_____
Ensured containers are labeled	_____	Established procedures to evaluate effectiveness	_____
Put in work orders for anything not up to code (eye washes, self-closing cabinet doors, etc.)	_____	Informed department of who the school's first responder is, and who is approved to clean up chemical spills	_____

_____

Signature Date

You can now complete this checklist using this form: https://forms.gle/EPCJkzQJ1wEXm2Eh9

Appendix C: OSHA Hazard Communication Program

Year: **2025-2026**

School: _____

A. Labels and Other forms of Warning

a. Containers must be labeled (name, hazard warning, legible) and a person or team designated to be responsible for ensuring labeling.

Person/people assigned:

b. Description of labeling system used

c. Description of written alternative to labeling of in-house containers (if used)

d. Procedures to review and update label information when necessary

B. Safety Data Sheets

a. Schools must have an SDS for each hazardous chemical which they use. Who will be responsible for obtaining and maintaining the SDS?

_____

Person/people assigned:

C. Employee Information and Training: The written program should include enough details about the school's plans to assess whether or not a good faith effort is being made to train employees.

A. Training and Format: The District Science Specialist will work with the Risk Management department to assign training through Vector Trainings each year. The program's format is based on the Vector Training System.

B. Training for New Employees: New employees will receive training during New Teacher Orientation as well as being assigned the Vector Training.

C. Program Maintenance and Evaluation: The safety program is accessible to employees within Vector Training. To maintain the program, all relevant information, including SDS information, will be stored in a central binder, ensuring a smooth transition for any new chemical hygiene officers. The program will be evaluated annually by reviewing incident reports, compliance reports, and Vector Training reports. The chemical hygiene officer will communicate any needs to the District Science Specialist.

SAMPLE OSHA Hazard Communication Program

Year: **2019-2020**

School: Granite High

A. Labels and Other forms of Warning

a. Containers must be labeled (name, hazard warning, legible) and a person or team designated to be responsible for ensuring labeling.

Person/people assigned: Tom Teacher and Irene Instructor

b. Description of labeling system used

ScholarID color coded
Green: Low hazard, Red: Flammables, White: Corrosives, Yellow: Oxidizers, Blue: Poisons

c. Description of written alternative to labeling of in-house containers (if used)

For solutions we mix ourselves, we will label with color code, chemical name and date.

d. Procedures to review and update label information when necessary

We will review this document on Sept 1, 2021. We will enter it into our Outlook calendars as a reminder and share the date with our administrator.

B. Material Safety Data Safety Data Sheets

a. Schools must have an SDS for each hazardous chemical which they use. Who will be responsible for obtaining and maintaining the SDS?

Person/people assigned: Irene Instructor

C. Employee Information and Training: The written program should include enough details about the school's plans to assess whether or not a good faith effort is being made to train employees.

A. Training and Format: The District Science Specialist will work with the Risk Management department to assign training through Vector Trainings each year. The program's format is based on the Vector Training System.

B. Training for New Employees: New employees will receive training during New Teacher Orientation as well as being assigned the Vector Training.

C. Program Maintenance and Evaluation: The safety program is accessible to employees within Vector Training. To maintain the program, all relevant information, including SDS information, will be stored in a central binder, ensuring a smooth transition for any new chemical hygiene officers. The program will be evaluated annually by reviewing incident reports, compliance reports, and Vector Training reports. The chemical hygiene officer will communicate any needs to the District Science Specialist.

Appendix D: Sample Disclosure Safety Clause

Science Lab Safety Statement

Science is a hands-on, investigative subject that often involves working with lab equipment, chemicals, and other materials that may pose safety risks if not handled properly. In our classroom, safety is our top priority. Students will be explicitly taught and routinely reminded of all lab safety procedures and expectations.

Participation in lab activities is a privilege that requires responsibility. Any student who fails to follow the established safety rules or acts in a way that compromises their safety or the safety of others will not be allowed to participate in lab activities until they demonstrate readiness to do so safely. Inappropriate behavior during labs may also result in disciplinary action.

By signing this disclosure, you acknowledge that while every effort is made to minimize risks, there is inherent risk involved in lab work. You also acknowledge your understanding that student participation in labs is contingent on safe and respectful behavior.