LABORATORY STANDARD OPERATING PROCEDURES
for
Flora High School

Last Revised 8/14/2017

(Chemical Hygiene Plan Appendix A)

I. Chemical Handling and Storage

- Laboratory chemicals shall be stored in a dedicated storage room organized according to hazard category to prevent interactions between incompatible chemicals (see Flinn guidelines).
- Laboratory chemicals will be stored only with chemicals of like classification.
    - Exception: small amounts of relatively unreactive chemicals may be stored together as part of a laboratory or demonstration kit (see Flinn guidelines).
- Fume hoods shall not be used for long term storage of chemicals.
- Chemicals shall be procured by laboratory supervisors through appropriate vendors and recorded in the laboratory chemical manifest upon arrival.
- Emptied chemical bottles should be noted in the chemical manifest.
- The chemical manifest shall be officially updated annually through an audit of laboratory inventory by the Chemical Hygiene Officer.
- Safety Data Sheets (SDS) will be available for every chemical stored in the laboratory. The location of SDS should be known to everyone in the lab.
- Handling and disposal of laboratory chemicals shall be conducted according to the guidelines set forth in its SDS and Flinn guidelines.
- Spills shall be cleaned by the laboratory supervisor using the materials from the provided spill kit.
- Pipetting should never be done by mouth.

II. Handling of Particular Classes of Hazardous Chemicals

Acids
- Acids shall be stored in a dedicated storage cabinet and organized to prevent interactions between incompatible chemicals (see Flinn Guidelines).
- Small acid containers should be stored in polypropylene bins to contain leaks.
- Safety glasses or goggles must be worn when dispensing acids.
- Latex or nitrile gloves shall be worn when using acids concentrated 0.5 M or higher.
- Acids concentrated 0.5 M or higher should be handled in a fume hood only.
- Oxyacids (nitric, sulfuric, etc.) should be handled in a fume hood with gloves regardless of concentration.
- Unused acids must be stored in clean HDPE or glass (oxyacids) containers and labeled appropriately, or otherwise disposed of according to Flinn disposal guidelines.

Bases (and Other Non-acidic Corrosives)
- Containers of solid bases and basic solutions should be stored in polypropylene bins to contain leaks.
- Safety glasses or goggles must be worn when working with bases and corrosives.
- Latex or nitrile gloves shall be worn when using bases concentrated 0.5 M or higher.
- Ammonia solutions more concentrated than household ammonia should be handled in a fume hood only.
- Unused basic solutions must be stored in a clean HDPE or glass containers and labeled appropriately, or otherwise disposed of according to Flinn disposal guidelines.

Poisons or Carcinogens
- Solid inorganic poisons should be dispensed in the fume hood to minimize dust inhalation.
- Safety glasses or goggles must be worn when working with poisons or carcinogens.

- Latex or nitrile gloves shall be worn when using solid poison/carcinogens or solutions concentrated 0.5 M or higher.
- Ammonia solutions more concentrated than household ammonia should be handled in a fume hood only.
- Unused basic solutions must be disposed of according to Flinn disposal guidelines.

Volatile Hazards

- Volatile hazards (including flammables) should be handled in the fume hood.
    - Exceptions: small amounts of solvents or reagents such as ethanol solutions.
- Safety glasses or goggles must be worn when working with volatile hazards.
- Unused volatiles must be disposed of according to Flinn disposal guidelines.

III. Handling of Glassware and Laboratory Equipment

- Glassware and other equipment not currently in use should be stored away from laboratory and classroom areas to prevent hazards and/or breakage.
- Glassware should be routinely inspected for cracks or sharp edges. Unsafe glassware should be disposed of in a container for broken glass.
- Non-glass sharps should be disposed of in a sharps container.
- Glassware should be transported in plastic bins and/or on a cart to minimize the risk of breakage.
- Glassware should be suitably secured to experimental apparatus during experiments.
- Glassware should not be subjected to heating by burner or hot plate in a manner than is inconsistent with its design.
- Heated glassware should be allowed to cool on a hot pad rather than the cold bench surface.
- All laboratory equipment (fume hoods, hot plates, stirrers, vacuum pumps, etc.) should be operated according to designer specifications and subjected to regular (at least annual) maintenance. In particular, electrical devices should be inspected to ensure that their wires and/or batteries are in good condition prior to each use.
- Lab benches and fume hoods should be kept clean and free of debris when not in use.
- Fume hood inlets and exhausts must be kept free of materials that will obstruct airflow.
- Fume hoods, safety showers, and eye washes should be inspected for proper operation every six months.

IV. Laboratory Experiments and Demonstrations

- All laboratory demonstrations and experiments should be thoroughly planned prior to implementation. Prior to engagement, a risk assessment should be performed where the following questions are considered and addressed:
    - What are the hazards and what can be done to minimize them?
    - What is the worst thing that could happen and what can be done to prevent it?
    - What steps should be taken if something goes wrong?
- Any unfamiliar experiment or demonstration should be practiced ahead of time with a coworker nearby.
- Proper personal protective equipment (PPE) such as goggles, gloves, laboratory coats, or aprons should be used when conducting experiments/demonstrations.

V. Emergency Procedures

- Employees shall be trained in the proper use of fire extinguishers.
- Employees, students, and visitors must know the location of fire alarms and be instructed on the location and usage all safety equipment.
- In the event of a fire, all employees, students, and visitors should exit the room after extinguishing any personally controlled flames.
- Unauthorized visitors should not be allowed into the laboratory.

VI. Additional Safety Considerations

- Eating, drinking, smoking, and gum chewing shall be prohibited in the laboratory.
- Unauthorized experiments are prohibited.

- Laboratory work should not be conducted alone.
- Laboratory benches must be cleaned thoroughly by the laboratory supervisor prior to use as instructional space.
- Hands should be washed with soap and water after all activities in the laboratory.
- Wearing long pants and closed-toe shoes at all times in the lab is encouraged. They are required when handing acids, bases, caustics, or other reactive chemicals.
- Laboratory supervisors should take all reasonable steps to minimize the hazard exposure of others in the laboratory.
- PPE for employees, students, and visitors should be maintained and made available by the laboratory supervisor.
- Chemicals shall be stored in closable containers and placed away from high traffic areas to minimize spills.
- Desks and personal effects must be arranged to permit safe passage to the safety shower and eye wash during laboratory exercises.
- Laboratory supervisors should undertake regular housekeeping measures to prevent buildup of dirty glassware, chemical containers, classroom debris, etc. that can become safety hazards.
- All employees, students, and guests should know where all laboratory safety equipment is located.
- All injuries, accidents, incidents, and near misses should be reported to the Chemical Hygiene Officer and the Administrative Director.
- Any unsafe conditions should be reported to the Lab Supervisor immediately.
- The laboratory should be inspected annually by the Chemical Hygiene Officer to identify and address safety concerns.
- Any safety concern that is apparent should be reported to the Chemical Hygiene Officer and addressed as soon as possible.

Any safety concerns not adequately addressed above should be discussed with the Chemical Hygiene Officer.