



# **Chemical Hygiene Plan**



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1.0 CHEMICAL HYGIENE OFFICER

**Chemical Hygiene Officer Appointment**

In compliance with the Federal Laboratory Standard Polk State College realizes our responsibility for the protection of our employees. We hereby institute the enclosed Chemical Hygiene Plan to assist us in our safety program.

Polk State College hereby establishes two types of chemical hygiene officers:

1. An Academic Chemical Hygiene Officer (CHO) who will oversee issues requiring an academic background in chemistry. The responsibilities of the Academic CHO are outlined in sections 6.0-9.0 and 15.0-18.0 of this document.
2. A Facilities Chemical Hygiene Officer who will oversee issues related to maintaining safety equipment and handling incidents requiring medical attention. The responsibilities of the Facilities CHO are outlined in sections 10.0-15.0 of this document.

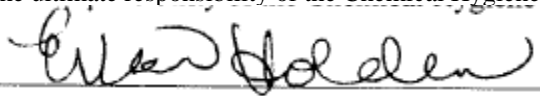
Polk State College hereby appoints chemical hygiene officers as follows:

Academic CHOs: Drs. Marily Lantz and Timothy Barnett

Facilities CHO: Mr. Robert Taylor, Director of Safety and Security

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

Although Polk State College is designating Drs. Lantz and Barnett and Mr. Taylor as our Chemical Hygiene Officers, we realize the success or lack of success of our Chemical Hygiene Plan rests with all of our employees. The ultimate responsibility of the Chemical Hygiene Plan rests with the President of the College.

  
 \_\_\_\_\_  
 3-25-10  
 \_\_\_\_\_

(Signed by the College President)

Date

**2.0**     **PURPOSE**

The protection of all laboratory staff and students from health hazards associated with hazardous chemicals in the laboratory. The facilities and precautions in this Chemical Hygiene Plan are compatible with current knowledge and regulations.

**3.0**     **SCOPE**

This Chemical Hygiene Plan applies to all employees and students performing activities in the anatomy, biology, chemistry, oceanography, physics and physiology laboratories of the Polk State College Winter Haven and Lakeland campuses.

**4.0**     **DEFINITIONS**

4.1     **Action Level** - A concentration designated in 29 CFR part 1910 for a specific substance, calculated as an 8-hour time-weighted average, which initiates certain required activities.

4.2     **ANSI**– American National Standards Institute

4.3     **Chemical Hygiene Officer** - An employee who is qualified by training or experience to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan.

4.4     **Chemical Hygiene Plan** - A written program developed and implemented which sets forth procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in the laboratory.

4.5     **Combustible liquid** - A liquid with a flashpoint at or above 140°F (60°C).

4.6     **Compressed gas** - a gas or mixture of gases confined within a container and having an absolute pressure that exceeds 40 psi at 70°F (21.11°C.).

4.7     **Designated area** - An area that may be used for work with select carcinogens, reproductive toxins or substances that have a high degree of acute toxicity. A designated area may be the entire laboratory or any portion within.

4.8     **Emergency** - An emergency is a situation that poses an immediate threat to human life or serious damage to property.

4.9     **Employee** – Any full-time or part-time worker at Polk State College.

4.10    **Explosive** - Substances or mixtures that react chemically to release energy required for their intended application. "Explosives," "pyrotechnics," and "propellants" are subclasses of energetic materials.

4.11    **Flammable** – As defined by OSHA: any liquid having a flash point below 100°F (37.8°C), except any mixture having components with flash points of 100°F (37.8°C) or higher, the total of which make up 99% or more of the total volume of the mixture.

4.12    **Flammable Gas** - a gas that at atmospheric pressure and temperature forms a flammable mixture with air when present at a concentration of 13% by volume or less or which forms a range of flammable mixtures with air wider than 12% regardless of the of the lower limit or projects a flame more than 18 inches beyond the ignition source with the valve fully opened, or the flame lashes back and burns at the valve with any degree of valve opening

4.13    **Flammable Liquids** - A liquid with a flashpoint below 100°F (60°C.).

4.14    **Flammable Solid** - A solid that is liable to cause a fire through friction, absorption of moisture, solid spontaneous chemical change, or retained heat from manufacturing or processing, or which can be

- ignited readily and when ignited, burns so vigorously and persistently as to create a serious hazard.
- 4.15 **Flashpoint** – The lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture with air and produces a flame when a source of ignition is present.
- 4.16 **Hazardous Chemical** – A chemical for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur as a result of exposure to this substance.
- 4.17 **Laboratory** - A facility where laboratory use of hazardous chemicals occurs. It is a workplace where relatively small quantities of hazardous chemicals are used in a non-production basis.
- 4.18 **Laboratory Scale** - Work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person.
- 4.19 **Laboratory Use of Hazardous Chemicals** - Handling or use of chemicals in which all of the following are met:
- 4.19.1 Chemical manipulations are carried out on a laboratory scale.
- 4.19.2 Multiple chemical procedures or chemicals are used.
- 4.19.3 The procedures involved are not part of a production process.
- 4.19.4 Protective laboratory practices and equipment are available and in common use to minimize employee chemical exposure.
- 4.20 **Laboratory Worker** - An individual employed in a laboratory workplace that may be exposed to hazardous chemicals in the course of performing his/her work duties.
- 4.21 **Organic Peroxide** - an organic compound that contains the bivalent -OO- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.
- 4.22 **Oxidizer** - A material that may cause the ignition of combustible materials without the aid of an external source of ignition or which, when mixed with combustible materials, increases the rate of burning of these materials when the mixtures are ignited.
- 4.23 **Physical hazard** - A hazard that arises from the material, structural, or operational features of the risk itself apart from the persons owning or managing it.
- 4.24 **Permissible Exposure Limit (PEL)**- The permitted exposure to any material as defined by OSHA in Table Z-1, Z-2, and Z-3 of CFR 1910.1000, Air Contaminants.
- 4.25 **Personal Protective Equipment (PPE)** - Devices worn by the worker to protect against hazards encountered in the work environment.
- 4.26 **Reproductive Toxins** - Chemicals that affect the reproductive capabilities including chromosomal damage (mutations) and injury to a fetus (teratogenesis).
- 4.27 **Select Carcinogen** - Any substance that meets any of the following criteria:
- 4.27.1 It is regulated by OSHA as a carcinogen.
- 4.27.2 It is listed under the category “known to be carcinogens” in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) most recent edition.
- 4.27.3 It is listed under Group 1 (Carcinogenic to humans), Group 2A (Reasonably anticipated to be carcinogenic), or Group 2B (Causes statistically significant tumor incidence) by the

International Agency for Research on Cancer Monographs (IARC) latest edition.

- 4.28 **Unstable reaction** - A reaction which will vigorously polymerized, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.
- 4.29 **Water Reactive** - A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

## 5.0 **RESPONSIBILITIES**

Responsibility for chemical hygiene compliance rests at all levels of the organization. Specific duties are as follows:

- 5.1 President of the College - This individual has overall responsibility to approve this document, designate the Chemical Hygiene Officer(s) in accordance with this plan and provide continuing support for institutional chemical hygiene activities.
- 5.2 Chemical hygiene officer(s) responsibilities are:
- 5.2.1 Work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices. (Academic and Facilities CHOs)
  - 5.2.2 Monitor procurement, use, and disposal of chemicals used in the lab. (Academic CHOs)
  - 5.2.3 See that appropriate audits are maintained. (Facilities CHO)
  - 5.2.4 Know the current legal requirements concerning regulated substances. (Academic CHOs)
  - 5.2.5 Seek ways to improve the chemical hygiene program. (Facilities and Academic CHOs)
  - 5.2.6 Ensure that all training occurs as defined by this document. (Facilities CHO)
  - 5.2.7 Review the Chemical Hygiene Plan periodically to ensure adequacy of this information at a minimum interval not to exceed a three year period. (Facilities and Academic CHOs)
- 5.3 Laboratory Supervisor/Coordinators responsibilities are:
- 5.3.1 Ensure that laboratory workers know and follow chemical hygiene rules.
  - 5.3.2 Ensure that protective equipment is available and in working order.
  - 5.3.3 Provide regular, formal chemical hygiene and housekeeping inspections ensuring that all deficiencies are corrected in a timely manner.
  - 5.3.4 Coordinate with the campus Facilities department for prompt repair of safety equipment.
  - 5.3.5 Maintain formal inventories of all chemicals and storage utilized at the campus and ensure that Material Safety Data Sheets are compiled and readily available to all exposed laboratory personnel and students.
  - 5.3.6 Coordinate waste accumulation and disposal practices for all wastes created by laboratory activities.
  - 5.3.7 Know the current legal requirements concerning regulated substances.
  - 5.3.8 Coordinate with the appropriate Chemical Hygiene Officer to:
    - 5.3.8.1 Determine the required levels of protective apparel and equipment for chemicals encountered.

- 5.3.8.2 Ensure that facilities and training for use of materials being ordered are adequate.
- 5.4 Laboratory Workers (full-time and part-time faculty) are responsible to:
  - 5.4.1 Plan and conduct each operation in accordance with the chemical hygiene procedures as defined in this document.
  - 5.4.2 Develop and apply good chemical hygiene habits.
  - 5.4.3 Understand the hazards of materials being worked with and ensure that safe handling and disposal practices have been defined and adhered to.
  - 5.4.4 Report unsafe conditions to the appropriate designated personnel within this plan.
- 5.5 Laboratory Students are responsible for:
  - 5.5.1 Performing all lab experiments in accordance with procedures and directions as defined by Laboratory Workers.
  - 5.5.2 Wear all prescribed personal protective equipment (PPE).
  - 5.5.3 Immediately report any damaged equipment to include PPE and immediately remove damaged equipment from service.

## **6.0 GENERAL LABORATORY PROCEDURES**

- 6.1 Appropriate Behavior in the Laboratory
  - 6.1.1 Employees and students will act in a professional manner at all times.
  - 6.1.2 Horseplay and practical jokes are expressly forbidden.
  - 6.1.3 Work involving a potentially dangerous activity shall require notification of a second on-site party who will be responsible for periodically verifying the operator is safe until the activity is completed.
  - 6.1.4 Visitors to the laboratory are to be escorted by an employee and are the responsibility of that employee. All safety regulations must be observed by visitors. No children under the age of 18 are allowed in the lab unless they are enrolled as a student in a PSC course.
  - 6.1.5 Only well understood reactions will be permitted to run unattended. Lights will be left on and an appropriate sign should be placed on the door. Provisions for containment of toxic substances in the event of a utility service failure (such as cooling water) to an unattended operation will be established.
  - 6.1.6 Injuries, no matter how slight, are to be reported immediately to the Lab Supervisor or Instructor in accordance with campus procedures. In addition, an incident report should be completed and retained by College Security.
  - 6.1.7 All laboratory employees and students will be advised about emergency procedures for medical, chemical, and power loss emergencies prior to participating in activities in designated labs.
  - 6.1.8 All exposed laboratory employees and students will be briefed on locations of emergency equipment and emergency utility shut-off locations prior to initiating any experiments.
- 6.2 Basic Chemical Handling Practices



- 6.2.1 Direct skin contact with chemicals will be avoided.
  - 6.2.2 Smelling or tasting chemicals is prohibited.
  - 6.2.3 Never pipet a chemical by mouth; a vacuum source or bulb must be used.
  - 6.2.4 Apparatus and reactions that have the potential to discharge a toxic chemical must be mechanically exhausted utilizing approved and inspected ventilation equipment.
  - 6.2.5 Damaged glassware will not be used and must be taken out of service immediately.
  - 6.2.6 Equipment will only be used for its designated purpose.
  - 6.2.7 Any first-time demonstration or experiment will be performed in a controlled trial evaluating the safety and controls established for the activity.
  - 6.2.8 Only designated and approved personnel will be allowed to have access to chemical storage rooms and to prepare materials for use.
- 6.3 Personal Habits in the Laboratory
- 6.3.1 Eating, drinking, gum chewing, and application of cosmetics are not permitted in the laboratory. Storage of same in the laboratory is prohibited.
  - 6.3.2 Smoking is prohibited in any laboratory environment in accordance with campus policy. Storage of same in the laboratory is prohibited.
  - 6.3.3 Storage of food and drinks is prohibited in refrigerators designated for the storage of chemicals.
  - 6.3.4 Hands will be washed before using the restroom, eating or drinking or smoking. All exposed skin which has had potential exposure to chemicals will be washed prior to eating and at the end of shift.
  - 6.3.5 Hair shoulder length or longer will be secured. Loose clothing is prohibited in the laboratory. Contact lenses are prohibited.
  - 6.3.6 Minimum Personal Clothing Requirements:
    - 6.3.6.1 Shoes that completely cover the foot and have flat soles.
    - 6.3.6.2 Socks.
    - 6.3.6.3 Full-length pants or an ankle-length dress.
    - 6.3.6.4 Shirt with sleeves, no exposed midribs.
    - 6.3.6.5 Lab coats or chemical protective aprons if the potential for splash of chemicals exists.
    - 6.3.6.6 ANSI approved safety glasses with side shields or approved chemical goggles if the potential for splash exists.
    - 6.3.6.7 Face shields and/or goggles will be worn when handling or transferring any corrosive materials.
- 6.4 Material Handling and Lifting
- 6.4.1 Use of mechanical aids is required when moving gas cylinders and dewars. All cylinders

must be capped prior to movement.

6.4.2 Load weight must be determined prior to attempting to move.

6.4.3 Two persons must handle bulky and awkward loads.

6.4.4 If manual lifting is necessary, lifting must be done by bending the knees and keeping the back straight; objects should be held as close to the body as possible.

6.4.5 All hazardous materials containers will be conspicuously labeled as to content and hazards.

#### 6.5 Housekeeping

6.5.1 Lab areas are to be kept clean and uncluttered. This will help prevent spillage, breakage, personal injuries and unnecessary contact of chemicals.

6.5.2 Contaminated glassware is not to be left out.

6.5.3 Spills are to be cleaned up immediately from work areas and floors.

6.5.4 Floors must be kept dry at all times.

6.5.5 Doorways and walkways will not be blocked or used for storage. Doors to chemistry labs must remain closed.

6.5.6 Access to exits, emergency equipment, and utility controls will never be blocked.

6.5.7 All emergency exits, fire extinguishers, emergency stops and disconnects, smoke detectors, and pull stations will be kept clear at all times.

6.5.8 Stairways and hallways will not be used for storage.

### 7.0 CHEMICAL PROCUREMENT, DISTRIBUTION, AND STORAGE

#### 7.1 Procurement

7.1.1 All purchasing of chemicals will be done through the Lab Coordinator.

7.1.2 The Academic and Facilities Chemical Hygiene Officers will jointly approve all large purchases of hazardous materials.

7.1.3 Quantities of materials requested will be limited to foreseeable requirements for each academic year.

7.1.4 Before a substance is received, information on proper handling, storage, and disposal should be reviewed by those who will be handling it.

7.1.5 A Material Data Safety Sheet (MSDS) will accompany all hazardous materials during transportation.

7.1.6 No container should be accepted without an adequate identifying label.

#### 7.2 Distribution

7.2.1 When highly toxic, corrosive, or flammable chemicals are hand carried between labs and stockrooms, the container shall be placed in an appropriate secondary container.

7.2.2 If an elevator is used to transport chemicals, handlers will not ride the elevator with the chemicals. One person will send the shipment while a second person waits to receive it.

- 7.2.3 Each PSC campus shall purchase chemicals for its own use. Toxic, flammable, and corrosive materials should not be transported between campuses.
  - 7.2.3.1 In limited situations and with the approval of a Chemical Hygiene Officer, a chemical with no potential for severe hazard can be packaged and sent through facilities.
  - 7.2.3.2 An MSDS sheet shall accompany any chemical transported off campus.
  - 7.2.3.3 Materials will be packed utilizing separate containers to minimize potential for spills or breaks.
  - 7.2.3.4 All liquid materials will be packed within appropriate secondary containers or absorbent sufficient to contain all content of a container.
- 7.3 Stockroom Chemical Storage
  - 7.3.1 Access to chemical storage rooms will be restricted to personnel approved by a Chemical Hygiene Officer.
  - 7.3.2 Chemical storage areas will remain locked to prevent unauthorized traffic.
  - 7.3.3 Storage of concentrated acids and bases should be limited to a maximum of 100 milliliters of each product unless stored in an approved and rated corrosive storage cabinet.
  - 7.3.4 No flammable materials should be stored outside an approved flammables storage cabinet. Flammables kept outside a cabinet should be in safety cans.
  - 7.3.5 Special shipping containers will be utilized as appropriate.
  - 7.3.6 As possible, original shipping packages, e.g. acids and bases will be stored in styrofoam cubes.
  - 7.3.7 All chemicals will be dated upon receipt.
  - 7.3.8 A permanent and perpetual inventory of all chemicals will be maintained.
  - 7.3.9 All chemicals will be stored in chemically compatible families utilizing the Flinn Scientific Inc. Chemical Storage Pattern Chart found in the Flinn Scientific Catalog and Reference Manual. A summary is found in Appendix A of this document.
    - 7.3.9.1 If a material is not listed in Appendix A, the Lab Coordinator will contact Flinn Scientific to obtain correct classification and storage pattern location.
  - 7.3.10 Incompatible chemicals will not be stored together. See Appendix B for potential incompatible items.
  - 7.3.11 Chemicals will not be stored on shelves above eye level.
  - 7.3.12 The storage area and cabinets will be labeled to identify the hazardous nature of the products stored within.
  - 7.3.13 Fire extinguishers will be in each storage room. Extinguishers will be of the appropriate size and type to address the type and quantities of combustible and flammable materials encountered.
  - 7.3.14 An approved eyewash station and fire blanket will be within 25 feet of the chemical storage area.

- 7.3.15 Shelving sections will be secured to walls or floor to prevent tipping of entire sections.
  - 7.3.16 Shelves will be equipped with lips to prevent products from rolling off.
  - 7.3.17 Chemicals will not be stored on the aisle ways except in approved shipping containers.
  - 7.3.18 The storage area will be ventilated by at least four changes of air per hour. Ventilation exhaust will be isolated to the chemical storage area.
  - 7.3.19 No unlabeled products will be stored.
  - 7.3.20 Exits will be entirely free of the presence of hazardous materials.
  - 7.3.21 Water-reactive products (sodium metal, potassium metal, etc.) will be stored under dry oil or kerosene.
  - 7.3.22 Neutralizing chemicals and absorbent materials for spill cleanup will be readily available in sufficient type and quantity for materials in storage.
  - 7.3.23 Emergency telephone numbers will be posted in the chemical storage area.
  - 7.3.24 No sources of open flame or ignition are allowed chemical storage areas.
  - 7.3.25 Stockrooms/storerooms shall not be used as preparation or repackaging areas.
  - 7.3.26 Metal shelving/parts shall be checked periodically for damage from corrosive vapors.
  - 7.3.27 Each shelf shall have the smaller containers near the front and the large containers toward the back of the shelf to minimize the possibility of spills or breakage.
  - 7.3.28 Peroxide formers: Ethers, liquid paraffins, and olefins form peroxides on exposure to air and light. Peroxides are extremely sensitive to shock, sparks, or other forms of accidental ignition (even more sensitive than primary explosives such as TNT). Since these chemicals are packaged in an air atmosphere, peroxides can form even though the containers have not been opened. Unless an inhibitor was added by the manufacturer, sealed containers of ethers should be discarded after one (1) year. Opened containers of ethers should also be discarded within one (1) year of opening. All such containers should be dated upon receipt and upon opening.
- 7.4 Laboratory Storage
- 7.4.1 Amounts stored in the laboratories will be as small as practical and as anticipated for immediate use.
  - 7.4.2 Chemicals may not be stored on laboratory bench tops or in fume hoods.
  - 7.4.3 Exposure of chemicals to heat or direct sunlight should be avoided.

## **8.0 CHEMICAL LABELING**

- 8.1 Each container must be labeled to identify the hazardous chemicals contained in the receptacle, the manufacturers name and address, and the hazardous warnings appropriate for employee protection in accordance with the Code of Federal Regulations, Title 29, Section 1910.1200 (f).
- 8.2 Laboratories will utilize the Hazardous Material Identification System (HMIS) system of labeling

along with any other labels that will convey hazards associated with the material (Appendix C).

- 8.3 Laboratories will not need to affix a new label to comply with this section if the chemical manufacturers' label already conveys this information.
- 8.4 Each individual employee is responsible for seeing that employees label the containers appropriately.
- 8.5 Each individual employee shall ensure that labels are accurate by referring to the information about the substance on the MSDS and on the original container. MSDS documents for all chemicals used in the lab should be available in the lab prep areas and in each lab.
- 8.6 No person may remove or deface the labels, unless they are immediately and properly relabeled.
- 8.7 Labels must in legible English.
- 8.8 The labels must be understandable and prominently displayed. Materials which cannot be individually labeled must have their storage areas labeled.
- 8.9 All containers will have the appropriate label, tag or marking prominently displayed indicating the identity, safety and health hazards of the materials contained.
- 8.10 Portable containers which contain a small amount of chemical need not be labeled if they are used immediately that shift, but must be under the strict control of the person using the product.
- 8.11 All warning labels, tags, etc., must be maintained in a legible condition and not be defaced.
- 8.12 Incoming chemicals are to be checked for proper labeling.
- 8.13 HMIS labels are used to identify the contents of all secondary containers and any original container that is not properly or clearly labeled by the manufacturer.
- 8.14 Hazardous Waste Stickers shall be used to identify all hazardous waste on site and shall be filled out in accordance with local, state, federal, Hazardous Material Transportation Act, and DOT regulations.
- 8.15 Laboratory personnel training will include how to read and understand the meanings of all labels and the labeling systems used.
- 8.16 When solutions are made and internal labels developed for the storage containers, the new labels must contain at a minimum the following information:
  - 8.16.1 Chemical name/identity (full name)
  - 8.16.2 Name of preparer (initials)
  - 8.16.3 Date information was prepared
  - 8.16.4 Concentration
  - 8.16.5 Associated hazards

## **9.0 STUDENT WORK PRACTICES**

- 9.1 It is the responsibility of each instructor to conduct a safety orientation of the laboratory and expected work practices prior to any exposure to laboratory hazards.
- 9.2 Instructors will conduct a safety orientation at the beginning of each semester. The content of the orientation will include a review and discussion of the departmental student safety rules and evacuation procedures (Section 9.3) and a review and demonstration of all emergency equipment

located in the laboratory.

9.3 Each student must review and sign a course-appropriate acknowledgement of safety rules before exposure to any laboratory hazards. Acknowledgements are as follows:

9.3.1 Anatomy and Physiology: Appendix D

9.3.2 Biology: Appendix E

9.3.3 Chemistry: Appendix F

9.3.4 Oceanography and Physical Sciences: Appendix G

9.3.5 Microbiology: Appendix H

9.4 Periodic review of laboratory rules throughout the semester with students is recommended.

## **10.0 VENTILATION AND LABORATORY EXHAUST HOODS**

10.1 General laboratory ventilation will provide airflow into the laboratory from non-laboratory areas and will be exhausted to the exterior of the building.

10.2 All laboratory doors will remain closed to allow ventilation to operate as designed.

10.3 Any reaction that has the potential to produce unpleasant and/or potentially hazardous fumes, vapors, or gases will be performed under a closable fume hood equipped with proper mechanical ventilation and constructed of materials of suitable to confine and contain such gases.

10.4 Lab Hood Operation

10.4.1 All lab hoods will have a minimum capture face velocity of  $100 \pm 20$  feet per minute.

10.4.2 When in use, the sash of the lab hood will be lowered to designated and marked heights on the frame of the hood to provide personnel protection.

10.4.3 All containers and equipment will be kept a minimum of six inches from the back of the hood to ensure proper operation of the hood.

10.4.4 Chemicals will not be allowed to vaporize in the hoods as a means of disposal.

10.4.5 All hood sashes and panels will be in place before operating.

10.4.6 Electrical ignition sources or open flames are not permitted in the hood if combustible or flammable liquids or gases are present.

10.4.7 Hoods with an inspection date posted in excess of one year or hoods with an unfavorable inspection result will not be utilized.

10.4.8 Hoods that are not functioning correctly will be immediately removed from service and conspicuously labeled as "Do Not Use"; the campus Facilities department will be notified to repair the equipment.

10.4.9 If a failure occurs on a lab hood the following immediate actions are required:

10.4.9.1 Close the sash of the hood immediately to contain any hazardous vapor or fumes.

10.4.9.2 Activate the emergency fan exhaust switch if accessible.

10.4.9.3 De-energize all powered equipment; isolate all fuel sources that can be accessed without endangering students or employees.

10.4.9.4 Notify other laboratory students or employees in the work area as to the problem occurring.

10.4.9.5 Post “Do Not Enter” signs or designate employees to prevent entry into the laboratory.

10.4.9.6 Activate the campus response program

#### 10.5 Inspection of Hoods

10.5.1 The campus Facilities department will be responsible to conduct annual flow testing of each hood to ensure that the hood is functioning as designed and maintaining proper capture velocities at the face of the hood.

10.5.2 Hoods will be labeled with the inspection date and results.

10.5.3 Appropriate sash heights will be marked to ensure that proper capture velocities are maintained.

### 11.0 **EMERGENCY EQUIPMENT**

#### 11.1 Inspection

11.1.1 All emergency equipment, including fire extinguishers, emergency eyewashes and showers, chemical clean-up supplies, emergency shut-off valves, and emergency lighting, will be inspected on a monthly basis.

11.1.2 The Facilities Chemical Hygiene Officer will designate individual(s) in the Facilities department responsible to conduct monthly inspections.

11.1.3 It will be the responsibility of the designated individual(s) to communicate any deficiencies to the campus Facilities department. The designated individual(s) will be responsible to track any deficiencies noted in the inspection to closure.

11.1.4 All monthly inspections will be documented by initializing inspection logs or tags attached to the equipment. If it is impractical to tag the equipment, the inspection log will be posted as close as practical to the equipment.

#### 11.2 Fire Extinguishers

11.2.1 A licensed and qualified inspector will be utilized for all annual inspections and servicing of all fire extinguishers.

11.2.2 Locations of fire extinguishers shall be conspicuously posted.

11.2.3 The fire extinguisher type and size must be adequate for the hazards present.

#### 11.3 Eyewashes and Showers

11.3.1 All emergency showers will be plumbed with potable water and maintain water temperature between 60- 90 degrees F.

#### 11.4 Chemical Spill Kits

11.4.1 Chemical spill kits with appropriate media to address spills of corrosives, bases, mercury and

flammable liquids will be located in all chemical storage and end-use locations.

11.4.2 All chemical spill clean up materials will be stored in a conspicuously posted location, easily accessible from all areas of the laboratory.

11.5 Emergency Lighting.

11.5.1 Emergency lighting must clearly illuminate all aisle ways designated for emergency exit.

11.5.2 All designated emergency exits must have illuminated signage posted

11.6 Alarm Systems

11.6.1 Visual strobe must be present and visible from all areas of the laboratory.

11.6.2 Audible alarms must be uniquely identifiable and perform a minimum of 15 decibels above normal noise levels encountered in the lab.

11.6.3 Pull stations will be located at the designated emergency exit points for the laboratory.

11.6.4 The alarm system will be monitored by an outside third party in accordance with local fire code.

## **12.0 EMERGENCY SPILL PROCEDURES**

12.1 Chemical Spills and Accidents

12.1.1 Prevention activities: When chemicals are going to be handled and used, preventive measures should always be considered. Considerations should be made in the following areas:

12.1.1.1 Design experiments/procedures to minimize spill possibilities. Equipment and materials should be put away as soon as they are no longer needed.

12.1.1.2 Student chemical handling expectations should be reviewed prior to initiating an experiment.

12.1.1.3 All students must have direct supervision when performing labs.

12.1.1.4 Hazardous materials should only be transferred using methods that provide secondary containment appropriate for the chemical in use.

12.1.1.5 Material Safety Data Sheets should be reviewed and consulted prior to use of the chemical.

12.1.2 When dispensing chemicals the following precautions should be followed:

12.1.2.1 Dispense and mix all chemicals under a fume hood.

12.1.2.2 Supply small portions of each chemical used in containers for student use. Do not use bottles or other storage containers in which the chemical is stored.

12.1.2.3 Dispense chemicals over a spill containment tray or an absorbent pad.

12.1.2.4 Use a spatula and weigh boat to weigh out chemicals.

12.1.2.5 Once the amount needed is dispensed, close the container immediately.



- 12.1.2.6 To eliminate the potential for contamination of virgin materials, do not return unused chemicals to original containers.
  - 12.1.2.7 Avoid raising chemical dust when using solids; consult the product MSDS for protection from respiratory hazards.
  - 12.1.2.8 Use a stirring rod when pouring liquids to help direct the flow.
  - 12.1.2.9 When mixing concentrated solutions, pour slowly.
  - 12.1.2.10 Do not quickly dump chemicals together. Observe initial reaction with a small amount and wait before adding more.
- 12.2 Spill Response and Control
- 12.2.1 Containment and Cleanup Equipment
  - 12.2.2 The following materials and equipment should be available at all chemical storage and handling areas:
    - 12.2.2.1 A mercury spill kit.
    - 12.2.2.2 Chemical absorbent kits containing pillows, pads, and loose material approved for chemical absorption.
    - 12.2.2.3 Neutralization kit: one for base materials and another for acids.
    - 12.2.2.4 Chemically resistant storage containers for storage of used chemical clean up materials.
- 12.3 Chemical Spill Response Guidelines
- 12.3.1 General Requirements
    - 12.3.1.1 Quickly assess the spill, its hazards, and the danger to laboratory occupants. Notify other lab personnel of the accident and, if necessary, evacuate the area.
    - 12.3.1.2 Eliminate all sources of ignition and heat if chemical is flammable and it is safe to do so.
    - 12.3.1.3 Consult the MSDS(s) for the spilled chemical(s), including hazards, spill response procedures, and first aid measures.
    - 12.3.1.4 Contact internal spill-response personnel for major spills (ext. 5059).
    - 12.3.1.5 Call 911 (fire department, ambulance) if lab occupants' safety is at risk, there are injuries, or spill cleanup is beyond personnel training and knowledge to safely clean up.
    - 12.3.1.6 Tend to injured or contaminated persons as directed by MSDS. If personnel are splashed by a chemical they know is innocuous, they may have time to contain the

spill before cleaning themselves. If the safety shower near a chemical spill is used, note that the water may expand the spill area.

12.3.1.7 Avoid breathing vapors from the spill. Ventilate the room and wait before cleaning up if the material is producing heat or giving off vapors.

12.3.1.8 Wear protective equipment as directed by MSDS when cleaning the spill.

12.3.1.9 Contain spill only when it's safe to approach area without exposing anyone to risk.

### 12.3.2 General Spill Containment Methods

12.3.2.1 Prior to initiate any clean up, the material or compound should be identified to determine the substance(s) involved. Consult the material safety data sheets for the appropriate cleanup methods and materials to be used.

12.3.2.2 Put on all appropriate PPE as designated by the MSDS sheet.

12.3.2.3 Select the appropriate absorbent media based on the material involved and the guidelines on the material safety data sheet.

12.3.2.4 Apply the absorbent material in accordance with the instructions for the product. Start at the most outer edge of the material and work from the edge to the center of the spilled material.

12.3.2.5 Allow the absorbent materials to become fully saturated before adding additional materials. If neutralization products are being used, work in the product with broom to ensure even distribution.

12.3.2.6 Use plastic dustpan and broom to pick up materials. All materials should be placed in an appropriate chemical- resistant container.

12.3.2.7 Once materials have been contained, seal container and label it to identify the substance(s) contained.

12.3.2.8 Deliver materials to the chemical storage room and notify a Chemical Hygiene Officer of the spill and clean-up actions.

12.3.2.9 All materials involved in the cleanup of the spill need to be decontaminated and returned to service if possible. If materials were consumed during the cleanup of the spill, notify the Lab Coordinator so that replacement materials may be procured.

### 12.3.3 Mercury Cleanup Procedures

12.3.3.1 Mercury is one of the most toxic chemicals in our environment. It "vaporizes" at room temperature, producing invisible, tasteless, odorless, and extremely dangerous vapor. When spilled and left untreated, mercury will continue to emit toxic vapor for years.

12.3.4 All laboratory personnel should be aware of the equipment that contains mercury and use extra caution when using this equipment. The most typical equipment will be mercury thermometers and sphygmomanometers (blood pressure cuffs).

12.3.5 A Mercury spill kit should be immediately available in the lab area if mercury-containing products are going to be used.

- 12.3.6 In case of a mercury spill event:
  - 12.3.6.1 Evacuate people from the spill area.
  - 12.3.6.2 Turn the thermostat down. Close the room off from the rest of the building.
  - 12.3.6.3 Avoid direct skin contact. Wear goggles and vinyl or neoprene gloves when cleaning a spill.
  - 12.3.6.4 Clean up with a mercury spill kit. The kit contains material that binds mercury droplets and prevents spreading.
  - 12.3.6.5 Mercury beads can be picked up with sticky tape or an eye dropper supplied in the cleanup kit.
  - 12.3.6.6 Carefully transfer mercury droplets into an unbreakable vapor-tight plastic container. Examine the spill area thoroughly to ensure that all materials have been absorbed. All cleanup materials including contaminated materials, need to be contained in vapor-tight containers.
  - 12.3.6.7 Never sweep with a broom or wipe with a cloth or paper towel as this will scatter mercury droplets. Never use a vacuum, as this will spread mercury vapors into the air and permanently contaminate the vacuum.
  - 12.3.6.8 Never use household cleaning products. They may react violently with the mercury and release toxic gases.
  - 12.3.6.9 All sealed containers should be placed in a fume hood. The Laboratory Coordinator should be notified immediately to arrange for proper disposal.

### **13.0 EMERGENCY MEDICAL PROCEDURES**

- 13.1 General Requirements:
  - 13.1.1 All medical events require prompt medical attention. Immediately call 911 emergency services; then call PSC safety officers at x5059.
  - 13.1.2 Medical treatment should be performed by qualified, trained first aid trained personnel.
  - 13.1.3 Immediately consult Material Safety Data Sheets for proper medical-treatment protocol. MSDS sheets should accompany the injured victim(s) during transport to receive formal medical treatment.
  - 13.1.4 Do not move injured persons unless they are in further danger from inhalation or skin exposure from the event.
- 13.2 Chemicals Spills on the Body
  - 13.2.1 Quickly remove all contaminated clothing and footwear.
  - 13.2.2 Immediately flood the affected body area with cold water for at least 15 minutes. Remove jewelry to facilitate removal of any residual material.
  - 13.2.3 Wash off chemical with water only. Do not use neutralizing chemicals, creams, lotions or salves.
  - 13.2.4 Immediately seek professional medical treatment.

- 13.3 Chemical Splash in the Eye
  - 13.3.1 Irrigate eyeball and inner surface of eyelid with plenty of cool water for at least 15 minutes. Forcibly hold eyelids open to ensure effective wash.
  - 13.3.2 Check for and remove contact lenses as appropriate.
  - 13.3.3 Immediately seek professional medical treatment.
- 13.4 Ingestion of Hazardous Chemicals
  - 13.4.1 Identify the chemical ingested and obtain the appropriate MSDS sheet.
  - 13.4.2 Immediately call 911 for an ambulance; then notify PSC safety officers at x5059.
  - 13.4.3 Call the Poison Information Center by dialing 1-800-222-1222.
  - 13.4.4 Follow emergency treatment protocols as defined by the MSDS sheet and the Poison Information Center.
  - 13.4.5 Immediately seek professional medical treatment.
- 13.5 Inhalation of Smoke, Vapors, and Fumes
  - 13.5.1 Do not enter the area if you expect that a life threatening condition still exists, such as oxygen depletion, explosive vapors, or highly toxic gases (cyanide gas, hydrogen sulfide, nitrogen oxides, carbon monoxide).
  - 13.5.2 Anyone overcome with smoke or chemical vapors or fumes should be removed to clean air and treated for shock.
  - 13.5.3 Immediately seek professional medical treatment.
- 13.6 Burning Chemicals on Clothing
  - 13.6.1 Extinguish burning clothing by using the drop-and-roll technique or smothering with fire blankets used in laboratory areas.
  - 13.6.2 Follow emergency treatment protocols as defined by the MSDS sheet.
  - 13.6.3 Immediately seek professional medical treatment.
- 13.7 Fire and Fire-Related Emergencies
  - 13.7.1 If you discover a fire or fire-related emergency such as abnormal heating of material, a flammable gas leak, a flammable liquid spill, smoke, or odor of burning, immediately follow these procedures:
    - 13.7.1.1 Activate the building alarm (fire pull station). If not available or operational, verbally notify people in the building to initiate evacuation.
    - 13.7.1.2 Immediately initiate notification to the fire department by dialing 911. State the building and room number. Then notify PSC security at x5059.
    - 13.7.1.3 Isolate the area by closing windows and doors.
    - 13.7.1.4 Shut down equipment in the immediate area, as practical without creating risk to yourself.

13.7.1.5 Only attempt to use a fire extinguisher if the following criteria can be met:

1. You have been trained in fire extinguisher operation and use.
2. You have a back up responder equally trained and equipped.

#### **14.0 INJURY AND ILLNESS REPORTING**

- 14.1 Polk State College shall investigate all suspected overexposures to chemicals and injuries in a prompt and timely fashion.
- 14.2 If an exposure event or injury occurs with a staff member or student, a formal report needs to be completed as soon as practical using the College Incident Report form. The report needs to document all chemicals and circumstances involved in the overexposure.
- 14.3 Potential exposure events could include, but are not limited to:
- 14.3.1 Breakage of a chemical container resulting in injury or inhalation of fume or vapor.
  - 14.3.2 Direct contact with chemicals resulting in a rash or skin irritation.
  - 14.3.3 Symptoms such as nausea, dizziness and headaches, as well as other symptoms listed in the MSDS.
- 14.4 The Chemical Hygiene Officers and campus security should be immediately notified of the event and the circumstances of the event.
- 14.5 The instructor or Lab Coordinator will be responsible to contact appropriate medical professionals and make arrangements for non-emergency medical care and inform campus security. All acute medical events shall be immediately addressed by utilizing the medical response treatment protocols defined in section 13 of this document.
- 14.6 All aspects of the event need to be documented thoroughly. Completed reports need to be forwarded to the Academic and Facilities Chemical Hygiene Officers for review and acceptance.
- 14.7 PSC shall make medical consultation and examination available when:
- 14.7.1 Any sign or symptom of an overexposure to a chemical is present.
  - 14.7.2 Monitoring has indicated an overexposure to a chemical has occurred.
  - 14.7.3 There has been a spill or uncontrolled release of chemical fumes creating exposure and exposure symptoms.
- 14.8 All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee and without loss of pay.
- 14.9 PSC will provide the physician with the names of the chemicals used, circumstances of the exposure and all signs and symptoms of the exposure.
- 14.9.1 The medical examinations addressing an overexposure event must be maintained in confidence by the consulting physician and the Chemical Hygiene Officers.
- 14.10 If the Chemical Hygiene Officers determine that a potential for overexposure has occurred to other laboratory personnel, medical review will also be made available to the affected personnel.

#### **15.0 TRAINING AND INFORMATION**

- 15.1 All laboratory employees will be trained about the hazards of chemicals present in their work area and the content of this document.
- 15.2 This training will be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present. It will also be provided prior to assignments involving new exposure situations. A Chemical Hygiene Officer or designated qualified third party will provide the training. The training will include:
  - 15.2.1 Physical and health hazards of chemicals in the work area.
  - 15.2.2 Protective measures to follow including appropriate work practices, emergency procedures, and personal protection equipment.
  - 15.2.3 Procedures for reporting accidents, spills, and injuries.
  - 15.2.4 Applicable details of the Chemical Hygiene Plan.
- 15.3 All training will be documented. Records of training will be maintained by the Lab Coordinators for a minimum period of three years.

## **16.0 WASTE MANAGEMENT AND DISPOSAL**

- 16.1 All waste disposal activities will be supervised by the Lab Coordinators.
- 16.2 Lab Coordinators will consult the ScholAR and Flinn chemical disposal references to determine proper separation, accumulation, and disposal methods.
- 16.3 Any damaged or broken glassware (beakers, pipets, etc.) will be promptly swept up and disposed of in dedicated containers marked "Broken Glass Only." If chemicals are spilled at the same time that glass is broken, cleanup will occur in accordance with section 12 of this document.
- 16.4 All hazardous waste materials will be placed in the satellite accumulation area as designated by the Lab Coordinators.
- 16.5 Log sheets will be maintained in each satellite accumulation point to document the additions of waste to the respective areas.
- 16.6 Logged entries will include at a minimum the following information:
  - 16.6.1 Date the material was added.
  - 16.6.2 Description of the material.
  - 16.6.3 Quantity of the material.
  - 16.6.4 Name of person adding the material.
- 16.7 Use of intermediate accumulation containers in the lab area is prohibited with the exception of broken glass accumulation containers.
- 16.8 Unknown waste must be handled and disposed of as hazardous waste until subsequent determination or classification occurs to verify that it is non-hazardous.

## **17.0 CHEMICAL HANDLING PROCEDURES**

- 17.1 General Requirements
  - 17.1.1 Lab personnel are expected to research and know as much as possible about the chemical being handled. Informational resources available include; material safety data sheets, literature in the library, peer consultation, Laboratory Coordinators and the Chemical Hygiene Officers.
- 17.2 Working with Flammable and Combustible Liquids
  - 17.2.1 Hazards to be anticipated:
    - 17.2.1.1 Vapors can create an ignitable mixture in air
    - 17.2.1.2 Many flammable liquids are solvents and can create inhalation hazards.
    - 17.2.1.3 Skin contact must be avoided; irritation and skin absorption are common with materials of this nature.
    - 17.2.1.4 Tissue damage is a common effect of direct contact to skin.
- 17.3 Storage of flammable liquids
  - 17.3.1 All flammable liquids must be stored in an approved fire-rated cabinet when not in use.
  - 17.3.2 The maximum amount of materials allowed to be outside of an approved cabinet in the lab or storage area is:
    - 17.3.2.1 25 gallons of Class I-A liquids in containers.
    - 17.3.2.2 120 gallons combined of Class I-B, I-C, Class II. or Class III-A liquids in containers.
  - 17.3.3 Maximum storage in a fire-rated cabinet is:
    - 17.3.3.1 60 gallons of Class I or Class II liquids.
    - 17.3.3.2 120 gallons of Class III liquids.
  - 17.3.4 No more than three cabinets are permitted in an area unless there is a minimum 100-foot separation.
  - 17.3.5 Required controls when working with flammable and combustible liquids include:
    - 17.3.5.1 Work should be performed under an exhaust hood rated for flammables if practical.
    - 17.3.5.2 When transferring Class I liquids' bonding is required between the two containers.
    - 17.3.5.3 All transfer devices and containers must be rated for the hazard associated with the materials.
- 17.4 Corrosive Liquids
  - 17.4.1 Hazards to be anticipated:
    - 17.4.1.1 Severe irritation of the skin, eyes, mucous membranes, respiratory, and digestive track if direct contact, inhalation, or ingestion occurs.
  - 17.4.2 Storage of corrosive liquids:

- 17.4.2.1 Always store concentrated acids and bases in appropriate drip trays or plastic carriers if used frequently.
- 17.4.2.2 Always transport concentrated acids and bases in plastic carrier.
- 17.4.2.3 Always store oxidizing acids (nitric, sulfuric, perchloric) away from organic chemicals, paper, wood, or other flammables.
- 17.4.2.4 Drip tray residue must be removed as immediately as practical.
- 17.4.3 Required controls when working with corrosives include:
  - 17.4.3.1 Wear protective clothing (lab coat or apron, gloves, and goggles).
  - 17.4.3.2 Never add water to concentrated mineral acids or bases.
- 17.5 Compressed Gases
  - 17.5.1 Hazards to be anticipated:
    - 17.5.1.1 Compressed gas cylinders contain large amounts of energy, which can cause serious injury and physical damage.
    - 17.5.1.2 Compressed gasses may also be flammable, toxic, corrosive, or cryogenic.
  - 17.5.2 Storage of compressed gases:
    - 17.5.2.1 Compressed gas cylinders must be stored in the upright position with caps in place and secured with a strap or chain adequate to restrain the cylinder.
  - 17.5.3 Required controls when working with compressed gases include:
    - 17.5.3.1 Transport only with cap in place on suitable carrier.
    - 17.5.3.2 Use only appropriate fittings and regulators. Each gas type has special fittings.
    - 17.5.3.3 Do not permit gases of one type to contaminate another type. Use check valves and/or regulators.
    - 17.5.3.4 Always open valves slowly and cautiously.
    - 17.5.3.5 Return empty cylinders to storage, clearly marked "MT."
    - 17.5.3.6 Valves will be closed when cylinder is not use.
    - 17.5.3.7 Only approved lubricants will be used on cylinders and all gas fittings.
    - 17.5.3.8 Gloves will be used when handling cryogenic containers, hoses and fittings.

**18.0 WORKING WITH SUBSTANCES OF MODERATE TO HIGH CHRONIC TOXICITY OR HIGH ACUTE TOXICITY**

- 18.1 Carcinogen, Mutagens, Teratogens, and Reproductive toxins all are to be considered highly toxic and use should be minimized.
- 18.2 Handling of these materials should be restricted to experienced and qualified personnel.
- 18.3 Assure that at least 2 people are present at all times when handling and using these materials.



- 18.4 Common hazards associated with these materials:
  - 18.4.1 Exposures can potentially induce carcinogenesis, mutagenesis, and adverse reproductive outcomes.
- 18.5 General storage requirements include:
  - 18.5.1 These materials should be segregated from other materials.
  - 18.5.2 Maintain the minimum quantity necessary for immediate use.
- 18.6 Additional basic controls required:
  - 18.6.1 Work with these materials should be pre approved by a Chemical Hygiene Officer.
  - 18.6.2 Work in designated areas as approved by a Chemical Hygiene Officer or the Laboratory Coordinators.
  - 18.6.3 Use of protective clothing as defined by the material safety data sheet must be strictly adhered to.
  - 18.6.4 Work only with adequate engineering controls, such as hoods, glove boxes, etc.
  - 18.6.5 Immediately clean up any spills and decontaminate surfaces involved in the spill.
- 18.7 Toxic Metals
  - 18.7.1 Common hazards encountered:
    - 18.7.1.1 Toxic by inhalation, ingestion, and possible skin absorption or irritation.
  - 18.7.2 Storage requirements for toxic metals:
    - 18.7.2.1 All materials must be stored in approved chemical cabinets.
    - 18.7.2.2 Maintain separation with oxidizing materials.
    - 18.7.2.3 The minimum quantity necessary will be kept on hand.
  - 18.7.3 The following controls will be used with toxic metals:
    - 18.7.3.1 Work in the hood as much as possible.
    - 18.7.3.2 Protective clothing as defined by the material safety data sheet will be strictly adhered to.
    - 18.7.3.3 Spills will be cleaned up immediately, with the work area properly decontaminated.

Appendix A  
Flinn Chemical Storage Codes

Chemical	Flinn Storage Code
1,10-Phenanthroline Monohydrate	O2
1,2-Dichloroethane	O4
1,6-Hexanediamine	O2
1-Dodecanol	O2
1-Naphthol	O2
2,3,5-Triphenyl-2H- Tetrazolium Chloride	O4
2,6-Dichloroindophenol	O8
3-Indoleacetic Acid	O1
3-Indolebutyric Acid	O1
4-(t-Octyl) Phenol	O8
Acacia Gum	O1
Acetamide	O2
Acetanilide	O2
Acetic Acid	O1
Acetic Anhydride	O1
Aceto-Carmine Solution	O1
Acetone	O4
Aceto-Orcein Stain	I9
Acetylcholine Bromide	O2
Acetylsalicylic Acid	O1
Acridine Orange	O9
Adenine	O2
Adenosine Triphosphate, Disodium Salt	O2
Adipic Acid	O1
Adipoyl Chloride	O1
Adrenaline	O2
Adrenaline Chloride	O2
Agar	O-Misc
Agarose	O-Misc
Albumin (Egg)	O2
Alizarin Red S	O9
Alizarin Yellow R	O9
Alizarin Yellow R - QuickPrep Capsules	O9
Aluminum	I1
Aluminum Ammonium Sulfate 12-Hydrate	I2
Aluminum Chloride 6-Hydrate	I2
Aluminum Chloride Anhydrous	I2
Aluminum Chloride QuickPrep Solution	I2
Aluminum Hydroxide	I4
Aluminum Nitrate 9-Hydrate	I3
Aluminum Nitrate QuickPrep Solution	I3
Aluminum Oxide	I3
Aluminum Potassium Sulfate 12-Hydrate	I2
Aluminum Sodium Sulfate Anhydrous	I2
Aluminum Sulfate 18-Hydrate	I2
Aluminum Sulfate QuickPrep Solution	I2
Aluminum Sulfate x-Hydrate	I2
Amino Acids Set/22	O-Misc
Ammonia (Household)	I4

Appendix A  
Flinn Chemical Storage Codes (Continued)

<b>Chemical</b>	<b>Flinn Storage Code</b>
Ammonium Acetate	I2
Ammonium Acetate QuickPrep Solution	I2
Ammonium Bicarbonate	I4
Ammonium Bromide	I2
Ammonium Carbonate	I4
Ammonium Carbonate QuickPrep Solution	I4
Ammonium Chloride	I2
Ammonium Chloride QuickPrep Solution	I2
Ammonium Dichromate	I8
Ammonium Hydroxide	I4
Ammonium Metavanadate	I8
Ammonium Molybdate 4-Hydrate	I8
Ammonium Nitrate	*
Ammonium Nitrate QuickPrep Solution	I3
Ammonium Oxalate Monohydrate	I2
Ammonium Oxalate QuickPrep Solution	I2
Ammonium Persulfate	I6
Ammonium Persulfate QuickPrep Solution	I6
Ammonium Phosphate Dibasic	I2
Ammonium Phosphate Monobasic	I2
Ammonium Sulfate	I2
Ammonium Sulfide	I5
Ammonium Thiocyanate	I7
Amyl Acetate	O3
Aniline	O2
Aniline Blue	O2
Aniline Hydrochloride	O2
Antimony	I1
Antimony Potassium Tartrate	I2
Antimony Trichloride	I2
Ascorbic Acid	I1
Ascorbic Acid - QuickPrep Capsules	I1
Ascorbic Acid QuickPrep Solution	I1
Aurintricarboxylic Acid	O1
Balsam, Canada	O3
Barfoed Reagent	I2
Barium	I1
Barium Acetate	I2
Barium Carbonate	I4
Barium Chloride Anhydrous	I2
Barium Chloride Dihydrate	I2
Barium Chloride Dihydrate - QuickPrep Capsules	I2
Barium Chloride Dihydrate QuickPrep Solution	I2
Barium Hydroxide 8-Hydrate	I4
Barium Nitrate	I3
Barium Nitrate - QuickPrep Capsules	I3
Barium Oxide	I4
Barium Peroxide	I6

Appendix A  
Flinn Chemical Storage Codes (Continued)

Chemical	Flinn Storage Code
Barium Sulfate	I2
Basic Green 4	O9
Benedict's Powder	I2
Benedict's Qualitative Solution	I2
Benedict's Quantitative Solution	I2
Benedict's Solution - QuickPrep Capsules	I2
Benzoic Acid	O1
Benzophenone	O4
Benzyl Alcohol	O2
Bial's Reagent	O2*
Bismuth	I1
Bismuth Nitrate 5-Hydrate	I3
Bismuth Trichloride	I2
Biuret Powder	O2
Biuret Reagent Solution	I-Misc.
Borax	I4
Borax Carmine Stain	O9
Boric Acid	I9
Brass	I1
Brilliant Cresyl Blue	I2
Bromine Water	I2
Bromocresol Green	O9
Bromocresol Purple	O9
Bromophenol Blue	O9
Bromothymol Blue - QuickPrep Capsules	O9
Bromothymol Blue, Sodium Salt	O9
Bromothymol Yellow	O9
Buffer Solution	I-Misc.
Buffer Solution, Color Coded	I-Misc.
Butylated Hydroxy Toluene	
Butyric Acid	O1
Cadmium	I1
Cadmium Nitrate 4-Hydrate	I3
Caffeine	
Calcium	I1
Calcium Acetate Monohydrate	I2
Calcium Carbide	I5
Calcium Carbonate	I4
Calcium Chloride - QuickPrep Capsules	I2
Calcium Chloride Anhydrous	I2
Calcium Chloride Dihydrate	I2
Calcium Fluoride	I2
Calcium Hydroxide	I4
Calcium Hypochlorite	I6
Calcium Nitrate - QuickPrep Capsules	I3
Calcium Nitrate 4-Hydrate	I3
Calcium Nitrate QuickPrep Solution	I3
Calcium Oxide	I4

Appendix A  
Flinn Chemical Storage Codes (Continued)

<b>Chemical</b>	<b>Flinn Storage Code</b>
Calcium Phosphate Dibasic	I2
Calcium Phosphate Monobasic, Monohydrate	I2
Calcium Phosphate Tribasic	I2
Calcium Sulfate Dihydrate	I2
Calcium Sulfate Hemihydrate	I2
Calmagite	O9
Camphor	O4
Carbol Fuchsin	O9
Carbol Fuchsin Solution	O8
Carbon Disulfide	O7
Carborundum	I1
Carmine	O1
Carmine Aceto-Schneider Solution	O1
Carnoy's Solution	O2
Casein	O2
Catalase	O1
Cedarwood Oil	O3
Cellulase	O1
Cellulose	O2
Cereal Grass Media	
Charcoal	I10
Chloretone	
Chlorine Water	I2
Chlorocresol	
Chloroform	O4
Chlorophyll	O9
Chromatography Solvent	
Chromium	I1
Chromium (III) Chloride 6-Hydrate	I2
Chromium (III) Nitrate 9-Hydrate	I3
Chromium (III) Nitrate QuickPrep Solution	I3
Chromium (III) Potassium Sulfate 12-Hydrate	I2
Chromium (III) Sulfate n-Hydrate	I2
Chromium Oxide	I4
Citric Acid Anhydrous	O1
Citric Acid Monohydrate	O1
Clove Oil	O-Misc
Cobalt	I1
Cobalt (II) Chloride 6-Hydrate	I2
Cobalt (II) Chloride QuickPrep Solution	I2
Cobalt (II) Nitrate 6-Hydrate	I3
Cobalt (II) Nitrate QuickPrep Solution	I3
Cobalt (II) Sulfate 7-Hydrate	I2
Cobalt (II,III) Oxide	I4
Coconut Oil	O-Misc
Colchicine	O8
Congo Red	O9
Congo Red - QuickPrep Capsules	O9

Appendix A  
Flinn Chemical Storage Codes (Continued)

<b>Chemical</b>	<b>Flinn Storage Code</b>
Copper	I1
Copper (I) Chloride Anhydrous	I2
Copper (II) Acetate Monohydrate	I2
Copper (II) Bromide	I2
Copper (II) Carbonate, Basic	I4
Copper (II) Chloride Anhydrous	I2
Copper (II) Chloride Dihydrate	I2
Copper (II) Chloride QuickPrep Solution	I2
Copper (II) Nitrate 2.5 Hydrate	I3
Copper (II) Nitrate n-Hydrate	I3
Copper (II) Nitrate QuickPrep Solution	I3
Copper (II) Nitrate Trihydrate	I3
Copper (II) Oxide	I4
Copper (II) Sulfate - QuickPrep Capsules	I2
Copper (II) Sulfate 5-Hydrate	I2
Copper (II) Sulfate Anhydrous	I2
Copper (II) Sulfate QuickPrep Solution	I2
Copper (II) Sulfide	I5
Cork Dust	O-Misc
Cresol Red	O9
Crystal Violet	O9
Cyclohexane	O3
Cyclohexene	O3
D-(-)-Arabinose	O2
D-(+)-Galactose, Anhydrous	O2
D-(+)-Lactose Hydrate	O2
D-(+)-Maltose Monohydrate	O2
Decanoic Acid	O1
D-Fructose	O2
Diastase of Malt	O-Misc
Diatomaceous Earth	O-Misc
Dibutyl Phthalate	O3
Dimethylglyoxime	O2
Diphenylamine	O2
DL-Alpha Alanine	O1
DL-Aspartic Acid	O1
D-Xylose	O2
Dye, Reagent Red	O9
Dye, Vegetable	O9
EDTA	O9
EDTA Disodium Salt	O9
Eosin Y	O9
Eriochrome Black T	O9
Ethyl Acetate	O4
Ethyl Alcohol	O2
Ethyl Ether	O4
Ethylene Chloride	O4
Ethylene Glycol	O4

Appendix A  
Flinn Chemical Storage Codes (Continued)

<b>Chemical</b>	<b>Flinn Storage Code</b>
Ethylenediamine	O2
Evergreen Plant Preserving Fluid	
Fast Green Stain	O9
Fehling's Solution A (Copper)	I2
Fehling's Solution B (Alkaline)	I4
Firefly Lantern Extract	O9
Fluorescein	O8
Fluorescein Disodium Salt	O8
Formaldehyde	O3
Formalin	O3
Formalin Aceto-Alcohol Solution	
Formic Acid	O1
Fuchsin Acid Stain	O9
Fuchsin Basic Stain	O9
Gallium	I1
Gastric Juice (Artificial)	I9
Gelatin	O2
Gibberellic Acid	O1
Giemsa Stain	O9
Glucose Anhydrous	O2
Glucose Monohydrate	O2
Glucose-1 Phosphate Dipotassium Salt	O2
Glucose-1 Phosphate Disodium Salt Dihydrate	O2
Glucose-Tris-EDTA	
Glutaraldehyde	O3
Glutathione	O1
Glycerin	O1
Glycine	O1
Glycogen (From Oysters)	O2
Gram's Iodine	I-Misc.
Gram's Stain Kit	I2
Graphite	I1
Guaiacol	O2
Guar Gum	O-Misc
Gum Tragacanth	O-Misc
Hayem Diluting Fluid	
Hematoxylin	O2
Heptane	O3
Hexanes	O3
Histamine Diphosphate	
Holtfreters Solution	
Hormone, Root Forming Solution	
Humectant (Anti-Microbial)	
Hydrochloric Acid	I9
Hydrogen Peroxide	I6
Hydrogen Sulfide Water	I5
Hydroxylamine Hydrochloride	O2
Indigo Carmine Disodium Salt	O9

Appendix A  
Flinn Chemical Storage Codes (Continued)

Chemical	Flinn Storage Code
Ink	O-Misc
Insect Larvae Preserving Fluid	
Insect Preservation Solution	
Intestinal Juice, Simulated	
Invertase	O2
Iodine	I2
Iron	I1
Iron (II) Ammonium Sulfate 6-Hydrate	I2
Iron (II) Chloride 4-Hydrate	I2
Iron (II) Sulfate - QuickPrep Capsules	I2
Iron (II) Sulfate 7-Hydrate	I2
Iron (II) Sulfide	I5
Iron (III) Ammonium Citrate	I2
Iron (III) Ammonium Sulfate 12-Hydrate	I2
Iron (III) Chloride 6-Hydrate	I2
Iron (III) Chloride Anhydrous	I2
Iron (III) Chloride QuickPrep Solution	I2
Iron (III) Nitrate 9-Hydrate	I3
Iron (III) Nitrate QuickPrep Solution	I3
Iron (III) Oxide, Red	I4
Iron (III) Sulfate 5-Hydrate	I2
Iron (III) Sulfate 9-Hydrate	I2
Iron (III) Sulfate x-Hydrate	I2
Iron Sulfide	I5
Isobutyl Alcohol	O2
Isopentyl Alcohol	O2
Isopropyl Alcohol	O2
Janus Green B	O9
Kaolin	I4
Kerosene	O3
Knops Solution	I2
Lactic Acid	O1
Lactose Monohydrate	O2
Lanolin Anhydrous	O3
Lanolin Hydrous	O3
Latex	O3
Lauric Acid	O1
Lead	I1
Lead (II) Acetate Trihydrate	I2
Lead (II) Carbonate, White	I2
Lead (II) Chloride	I2
Lead (II) Nitrate	I3
Lead (II) Nitrate - QuickPrep Capsules	I3
Lead (II) Nitrate QuickPrep Solution	I3
Lead (IV) Oxide	I4
Lead Oxide	I4
Lead Sulfide	I5
Lens Cleaning Solution	



Appendix A  
Flinn Chemical Storage Codes (Continued)

Chemical	Flinn Storage Code
I-Glutamic Acid	O1
Limewater	I4
Linseed Oil	O2
Lipase	O2
Lithium	I1
Lithium Carbonate	I4
Lithium Chloride	I2
Lithium Chloride QuickPrep Solution	I2
Lithium Nitrate	I3
Lithium Nitrate QuickPrep Solution	I3
Litmus	O2
Litmus Solution	O2
L-Tartaric Acid	O1
L-Thyroxine Pentahydrate	O1
Luminol	O2
Lycopodium	O2
Lysozyme	O2
Magnesium	I1
Magnesium Carbonate 5-Hydrate	I4
Magnesium Carbonate Anhydrous	I4
Magnesium Chloride 6-Hydrate	I2
Magnesium Chloride QuickPrep Solution	I2
Magnesium Hydroxide	I4
Magnesium Nitrate 6-Hydrate	I3
Magnesium Nitrate 6-Hydrate - QuickPrep Capsules	I3
Magnesium Nitrate 6-Hydrate QuickPrep Solution	I3
Magnesium Oxide	I4
Magnesium Sulfate - QuickPrep Capsules	I2
Magnesium Sulfate 7-Hydrate	I2
Magnesium Sulfate Anhydrous	I2
Maleic Acid	O1
Maleic Acid Hydrazide	
Malonic Acid	O1
Manganese	I1
Manganese (II) Chloride 4-Hydrate	I2
Manganese (II) Chloride QuickPrep Solution	I2
Manganese (II) Sulfate Monohydrate	I2
Manganese (II) Sulfate QuickPrep Solution	I2
Manganese (IV) Dioxide	I4
Manganese Nitrate	I3
Menthol	O2
Mercury	I1
Mercury (I) Nitrate Dihydrate	I3
Mercury (II) Chloride	I2
Mercury (II) Iodide, Red	I2
Mercury (II) Nitrate Monohydrate	I3
Mercury (II) Nitrate QuickPrep Solution	I3
Mercury (II) Oxide, Red	I4

Appendix A  
Flinn Chemical Storage Codes (Continued)

Chemical	Flinn Storage Code
Methanol	O2
Methyl Cellulose	O-Misc
Methyl Ethyl Ketone	O4
Methyl Green	O9
Methyl Green Pyronin Y	O9
Methyl Orange - QuickPrep Capsules	O9
Methyl Orange, Sodium Salt	O9
Methyl Red	O9
Methyl Salicylate	O3
Methyl Violet 2B	O9
Methylene Blue	O9
Methylene Chloride	O4
Microscope Lens Solution	
Millon's Test Solution	
Mineral Oil	O2
Modified Trichrome Stain	O9
Molisch Test Solution	O2
n-Amyl Alcohol	O2
Naphthalene	O2
Naphthaleneacetic Acid	O1
n-Butyl Alcohol	O2
n-Butyric Acid	O1
Neutral Red	O9
Nickel	I1
Nickel Ammonium Sulfate 6-Hydrate	I2
Nickel Chloride 6-Hydrate	I2
Nickel Nitrate 6-Hydrate	I2
Nickel Nitrate 6-Hydrate QuickPrep Solution	I3
Nickel Sulfate 6-Hydrate	I2
Nicotine	O2
Nigrosin	O2
Ninhydrin	O2
Nitric Acid	I3
n-Propyl Alcohol	O2
Octyl Alcohol	O2
Oleic Acid	O1
Olive Oil	O-Misc
Orange IV	O9
Orcein	O9
Oxalic Acid Dihydrate	I1
Pancreatin	O2
Papain	O2
Paraffin Refined White Wax	O-Misc
Paraffin Wax	O-Misc
p-Dichlorobenzene	O4
Peanut Oil	O-Misc
Pentane	O3
Peppermint Oil	O2

Appendix A  
Flinn Chemical Storage Codes (Continued)

Chemical	Flinn Storage Code
Pepsin	O2
Peptone	O-Misc
Permutit (Zeolite)	
Petrolatum (White)	O3
Petroleum Ether	O4
pH Indicator Set	O9
Phenol	O8
Phenol Red	O9
Phenolphthalein	O9**
Phenyl Salicylate	O3
Phenythiourea	
Phloroglucinol	O8
Phosphate Buffer	
Phosphate Buffered Saline (PBS)	
Phosphoric Acid	I9
Physiological Saline	
Piccolyte II	
Piccolyte Synthetic	
Polyethylene Glycol	
Polyvinyl Alcohol	O2
Potassium	I1
Potassium Acetate	I2
Potassium Acid Phthalate	I2
Potassium Bicarbonate	I4
Potassium Binoxalate Monohydrate	I2
Potassium Bisulfate	I2
Potassium Bitartrate	I2
Potassium Bromate	I2
Potassium Bromide	I2
Potassium Bromide QuickPrep Solution	I2
Potassium Carbonate 1.5-Hydrate	I4
Potassium Carbonate Anhydrous	I4
Potassium Carbonate QuickPrep Solution	I4
Potassium Chlorate	I6
Potassium Chloride	I8
Potassium Chloride QuickPrep Solution	I8
Potassium Chromate	I8
Potassium Chromate - QuickPrep Capsules	I8
Potassium Chromate QuickPrep Solution	I8
Potassium Citrate Monohydrate	I2
Potassium Dichromate	I8
Potassium Ferricyanide	I7
Potassium Ferricyanide QuickPrep Solution	I7
Potassium Ferrocyanide Trihydrate	I7
Potassium Fluoride Anhydrous	I2
Potassium Hydroxide	I4
Potassium Iodate	I8
Potassium Iodide	I2

Appendix A  
Flinn Chemical Storage Codes (Continued)

<b>Chemical</b>	<b>Flinn Storage Code</b>
Potassium Iodide QuickPrep Solution	I2
Potassium Nitrate	I3
Potassium Nitrate - QuickPrep Capsules	I3
Potassium Nitrate QuickPrep Solution	I3
Potassium Nitrite	I3
Potassium Oxalate Monohydrate	I2
Potassium Permanganate	I8
Potassium Persulfate	I6
Potassium Phosphate Dibasic	I2
Potassium Phosphate Monobasic	I2
Potassium Phosphate Tribasic	I2
Potassium Polyacrylate	O3
Potassium Sodium Tartrate 4-Hydrate	I2
Potassium Sulfate	I2
Potassium Thiocyanate	I2
Potassium Thiocyanate QuickPrep Solution	I2
Propionic Acid	O1
Propylene Glycol	O2
Pyrogallic Acid	O4
Quinine Sulfate Dihydrate	O2
Rennet Tablets	O-Misc
Rennin	O-Misc
Resorcinol	O8
Ribonucleic Acid	O1
Ringer's Solution	O2
Safranin O	O2
Salicylic Acid	O1
Sand	I-Misc.
Schiff Aldehyde Solution	I2
Sebacoyl Chloride	O1
sec-Butyl Alcohol	O2
Sedi Sternheimer Stain	O9
Sesame Oil	I-Misc.
Silica Gel	I-Misc.
Silicon	I1
Silver	I1
Silver Acetate	I2
Silver Chloride	I2
Silver Nitrate	I3
Silver Nitrate - QuickPrep Capsules	I3
Silver Oxide	I4
Soap Solution, APHA	O2
Soap, Castile	O-Misc
Soda Lime	I4
Sodium	I1
Sodium Acetate Anhydrous	I2
Sodium Acetate QuickPrep Solution	I2
Sodium Acetate Trihydrate	I2

Appendix A  
Flinn Chemical Storage Codes (Continued)

<b>Chemical</b>	<b>Flinn Storage Code</b>
Sodium Benzoate	I2
Sodium Bicarbonate	I4
Sodium Bicarbonate - QuickPrep Capsules	I4
Sodium Bisulfate Anhydrous	I2
Sodium Bisulfate Monohydrate	I2
Sodium Bisulfite	I2
Sodium Borate, 10-Hydrate	I8
Sodium Bromate	I6
Sodium Bromide	I2
Sodium Bromide - QuickPrep Capsules	I2
Sodium Bromide QuickPrep Solution	I2
Sodium Carbonate Anhydrous	I4
Sodium Carbonate Monohydrate	I4
Sodium Carbonate Monohydrate - QuickPrep Capsules	I4
Sodium Carbonate Monohydrate QuickPrep Solution	I4
Sodium Chlorate	I6
Sodium Chloride	I2
Sodium Chloride - QuickPrep Capsules	I2
Sodium Chloride QuickPrep Solution	I2
Sodium Chromate 4-Hydrate	I8
Sodium Chromate 4-Hydrate QuickPrep Solution	I8
Sodium Chromate Anhydrous	I8
Sodium Citrate Dihydrate	I8
Sodium Dichromate Dihydrate	I8
Sodium Fluoride	I4
Sodium Hydrogen Phosphate - QuickPrep Capsules	I2
Sodium Hydroxide	I4
Sodium Hypochlorite	I6
Sodium Iodide	I2
Sodium Iodide QuickPrep Solution	I2
Sodium Lauryl Sulfate	I2
Sodium Metabisulfite	I2
Sodium Metasilicate	I4
Sodium Molybdate - QuickPrep Capsules	I2
Sodium Molybdate(VI), Dihydrate	I2
Sodium Nitrate	I3
Sodium Nitrate QuickPrep Solution	I3
Sodium Nitrite	I3
Sodium Oxalate	I2
Sodium Phosphate Dibasic 7-Hydrate	I2
Sodium Phosphate Dibasic Anhydrous	I2
Sodium Phosphate Monobasic Anhydrous	I2
Sodium Phosphate Tribasic, 12-Hydrate	I2
Sodium Polyacrylate	O3
Sodium Pyruvate	
Sodium Silicate	I2
Sodium Sulfate 10-Hydrate	I2
Sodium Sulfate Anhydrous	I2

Appendix A  
Flinn Chemical Storage Codes (Continued)

<b>Chemical</b>	<b>Flinn Storage Code</b>
Sodium Sulfide 9-Hydrate	I5
Sodium Sulfide QuickPrep Solution	I5
Sodium Sulfite Anhydrous	I2
Sodium Sulfite QuickPrep Solution	I2
Sodium Thiocyanate	I7
Sodium Thiosulfate - QuickPrep Capsules	I2
Sodium Thiosulfate 5-Hydrate	I2
Sodium Thiosulfate Anhydrous	I2
Sodium Thiosulfate QuickPrep Solution	I2
Spore Staining Solution	O9
Stain Set, Basic	O9
Stain Set, Basic, Premixed	O9**
Stain Set, Micro	O9
Stain Set, Vital	O9**
Starch	O-Misc
Starch - QuickPrep Capsules	O-Misc
Starch Indicator Solution	O-Misc
Stearic Acid	O1
Steel Shot	I1
Strontium Carbonate	I4
Strontium Chloride 6-Hydrate	I2
Strontium Nitrate	I3
Strontium Nitrate - QuickPrep Capsules	I3
Strontium Nitrate QuickPrep Solution	I3
Sucrose	O2
Sudan Black B	O9
Sudan III	O9
Sudan IV	O9
Sulfamic Acid	O1
Sulfanilic Acid	O1
Sulfur	I10
Sulfuric Acid	I9
Sulfurous Acid	I9
Talc	O-Misc
Tannic Acid	O1
Tegosept M (Methyl Paraben)	O3
tert-Butyl Alcohol	O2
Tetracycline	O2
Thermit Black Powder	I4
Thermit Ignition Mixture	I1
Thiamine Hydrochloride	O2
Thioacetamide	O2
Thiourea	O2
Thymol	O8
Thymol Blue	O9
Thymol Blue - QuickPrep Capsules	O9
Thymolphthalein	O9
Tin	I1

Appendix A  
Flinn Chemical Storage Codes (Continued)

Chemical	Flinn Storage Code
Tin (II) Chloride Dihydrate	I2
Tin (II) Chloride QuickPrep Solution	I2
Tin (IV) Chloride 5-Hydrate	I2
Tin (IV) Chloride QuickPrep Solution	I2
Tin (IV) Oxide	I4
Tincture Green Soap	
Toluene	O3
Toluidine Blue O	I2
Tricaine Methanesulfonate	O1
Trichloroacetic Acid	O1
Trichloroethylene	O4
Triethanolamine	O2
Tris-Borate-EDTA Buffer	
Trypsin	O2
Tryptone	O-Misc
Turpentine	O3
Universal Indicator Solution	O9
Urea	O2
Urease	O-Misc
Vegetable Coloring-Red	O9
Vegetable Oil	O-Misc
Vinegar	O1
Winkler's Solution #1	I2
Winkler's Solution #2	I4
Wood's Metal	I1
Wright's Blood Stain	O2
Wrights Stain Buffer	
Xylene	O3
Yeast	O-Misc
Zinc	I1
Zinc Acetate Dihydrate	I2
Zinc Carbonate	I2
Zinc Chloride	I2
Zinc Chloride QuickPrep Solution	I2
Zinc Nitrate 6-Hydrate	I3
Zinc Nitrate 6-Hydrate - QuickPrep Capsules	I3
Zinc Nitrate 6-Hydrate QuickPrep Solution	I3
Zinc Oxide	I4
Zinc Sulfate 7-Hydrate	I2
Zinc Sulfate 7-Hydrate - QuickPrep Capsules	I2
Zinc Sulfate 7-Hydrate QuickPrep Solution	I2
Zinc Sulfate Monohydrate	I2
Zinc Sulfide	I5

Appendix B  
Incompatible Chemical Chart

<b>CHEMICAL</b>	<b>KEEP OUT OF CONTACT WITH</b>
Acetic Acid	Chromic acid, nitric acid hydroxyl compounds, ethylene, glycol, perchloric acid, peroxides, permanganates
Acetone	Concentrated nitric and sulfuric acid mixtures
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Alkali Metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, the halogens
Ammonia, anhydrous	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid
Ammonium Nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine	Same as chlorine
Calcium Oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents.
Carbon tetrachloride	Sodium
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials
Chromic Acid	Acetic acid, naphthalene, camphor, glycerin, turpentine, alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Chlorine Dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene Hydroperoxide	Acids, organic or inorganic
Cyanides	Acids
Flammable Liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Hydrocarbons	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic Acid	Nitric acid, alkali
Hydrofluoric Acid	Ammonia, aqueous or anhydrous
Hydrogen Peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, flammable liquids, oxidizing gases
Hydrogen Sulfide	Fuming nitric acid, oxidizing gases, acetylene, ammonia (aqueous or anhydrous), hydrogen
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulfuric acid
Nitric Acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic Acid	Silver, mercury
Oxygen	Oils, grease, hydrogen; flammable liquids, solids, or gases
Perchloric Acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood
Peroxides, organic	Acids (organic or mineral), avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalies, reducing agents
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium Chlorate	Sulfuric and other acids
Potassium Permanganate	Glycerin, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds



Appendix B  
Incompatible Chemical Chart

<b>CHEMICAL</b>	<b>KEEP OUT OF CONTACT WITH</b>
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium Peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric Acid	Potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals, such as sodium, lithium, etc.)
Tellurides	Reducing agents

Appendix C  
Chemical Labels-HMIS

		<b>Health</b>
		<b>Flammability</b>
		<b>Reactivity</b>
		<b>Protective Equipment</b>

## Health Hazards

- 4 – Severe
- 3 – Extreme Danger
- 2 – Hazardous
- 1 – Slightly Hazardous
- 0 – Normal Material





































## Fire Hazards

- 4 – Below 73 degrees F
- 3 – Below 100 degrees F
- 2 – Above 100 degree F

## REACTIVITY

- 1 – Will Not Burn
- 4 – May Detonate
- 3 – Shock or heat may cause detonation
- 2 – Violent change
- 1 – Unstable if heated
- 0 – Stable

Appendix C  
Chemical Labels-HMIS (Continued)

HMIS® Letter	Required Equipment
<b>A</b>	 Safety Glasses
<b>B</b>	 Safety Glasses  Gloves
<b>C</b>	 Safety Glasses  Gloves  Protective Apron
<b>D</b>	 Face Shield  Gloves  Protective Apron
<b>E</b>	 Safety Glasses  Gloves  Dust Respirator
<b>F</b>	 Safety Glasses  Gloves  Protective Apron  Dust Respirator
<b>G</b>	 Safety Glasses  Gloves  Vapor Respirator
<b>H</b>	 Splash Goggles  Gloves  Protective Apron  Vapor Respirator
<b>I</b>	 Safety Glasses  Gloves  Dust Respirator  Vapor Respirator
<b>J</b>	 Splash Goggles  Gloves  Protective Apron  Dust Respirator  Vapor Respirator
<b>K</b>	 Air Line Mask or Hood  Gloves  Full Suit  Boots

## Appendix D

**Polk State College Laboratory Safety Rules  
Anatomy and Physiology Labs**

Maintaining a safe and healthy learning environment is an expectation of all students and instructors. The requirements listed below are the minimum expectations to be adhered to; additional requirements may be required for certain experiments and activities.

1. All accidents and injuries, regardless how minor will be immediately reported to the instructor.
2. Immediately report any equipment failure to your instructor.
3. Any personal medical concerns that compromise your safety will be discussed with the instructor.
4. No food, drinks, chewing gum, or tobacco products are allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair shoulder length or longer will be restrained behind or on top of the head.
6. Covered shoes must be worn in order to participate in lab. No sandals, Crocs, or flip-flops.
7. No children, guests, or other students are allowed without expressed approval of the instructor.
8. Do not sit on laboratory tables.
9. Gloves will be worn as required. Eye protection is required for all dissections. Eye protection will either consist of approved safety glasses or safety goggles.
10. Protective apparel is recommended for all wet labs. Examples of wet labs are those that involve chemical solutions (i.e. staining, preserved specimens, dissections, microorganisms, etc.) Dry labs include those that involve only demonstration models, bones or prepared slides and microscope work, etc. Remove the protective apparel and fold inside out for transport prior to leaving the lab.
11. Never mouth pipet. Use the special pipetting devices that are provided.
12. Do not allow any liquids to contact any electrical equipment or cords. Handle electrical cords with dry hands. Remove electrical plugs by pulling on the plug and not on the cord.
13. Use caution when working with hot plates. The heating surface appears the same whether cool or hot; so assume that the surface is hot. Be sure that the cords do not contact the heating surface. If hot plates are still hot at the end of lab, do NOT return them to the storage area, this will be done once they have cooled.
14. Broken glass will be immediately cleaned by utilizing a broom, dustpan and mop as necessary. Students will not handle broken glass by hand. All broken glass will be placed in a designated broken-glass container for proper disposal.
15. Lab benches and other work surfaces will be cleaned with a disinfecting solution at the beginning and end of each lab period. Disinfectant solution and paper wipes are provided in bottles in the sinks at the lab tables.
16. Students will not attempt to clean chemical spills until consulting with the instructor.
17. All dissected specimens and other biological waste will be disposed of by wrapping them in absorbent wipes and disposing of them in approved, designated containers.
18. The lab bench sinks will be used for liquid disposal only unless different and specific collection methods have been specified. Paper and disinfected gloves will be disposed of in ordinary trash.
19. All solid waste will be disposed of in approved and designated containers.
20. Emergency equipment, including emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets, will not be obstructed at any time and used only as intended.
21. In case of an alarm requiring evacuation, all equipment will be shut off, and everyone will exit the lab in accordance with evacuation maps posted at the exits to the labs. No re-entry will be allowed until the emergency event is declared over. The instructor will call roll outside to ensure that all students are evacuated.
22. Microscopes and other equipment will be stored in approved cabinets when not being actively used.
23. Any work outside of assigned laboratory times must be approved by your instructor and supervised by PSC staff.
24. All models must be handled with care. Do not point out structures or mark on the models with a pen or pencil. Use the designated pointer sticks for that purpose.
25. Models will be put away properly. All models will be assembled correctly prior to being placed in their designated locations.
26. Conduct yourself quietly in the laboratory, avoid crowding and haste, and maintain an environment free of clutter, distraction, and disruptions. Carefully follow instructions for the use of specialized equipment and ask for help when necessary. Keep your work area clean and return special items to their original location. Always properly label solutions, tubes, slides, drawings, etc.
27. Do not remove any laboratory equipment such as slides, models, or supplies from the lab. They are for use in the lab only. The TLCC has many biological models, slides and microscopes for student use.



## Appendix E

**Polk State College Laboratory Safety Rules  
Biological Sciences Labs**

Maintaining a safe and healthy learning environment is an expectation of all students and instructors. The requirements listed below are the minimum expectations to be adhered to; additional requirements may be required for certain experiments and activities.

1. All accidents and injuries, regardless how minor, will be immediately reported to the instructor.
2. Immediately report any equipment failure to your instructor.
3. Any personal medical concerns that compromise your safety will be discussed with the instructor.
4. No food, drinks, chewing gum, or tobacco products are allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair shoulder length or longer will be restrained behind or on top of the head.
6. Covered shoes must be worn in order to enter the lab and participate in lab. No sandals, Crocs, or flip-flops.
7. No children, guests, or other students are allowed without expressed approval of the instructor.
8. Do not sit on laboratory tables.
9. Gloves will be worn as required. Eye protection is required for wet chemistry activities. Eye protection will consist of either approved safety glasses or safety goggles.
10. Protective apparel is recommended for all wet labs. Examples of wet labs are those that involve chemical solutions (i.e. staining, preserved specimens, dissections, microorganisms, etc.) Dry labs include those that involve only demonstration models, bones or prepared slides and microscope work, etc. Remove the protective apparel and fold inside out for transport prior to leaving the lab.
11. Never mouth pipet. Use the special pipetting devices that are provided.
12. Broken glass will be immediately cleaned by utilizing a broom, dustpan and mop as necessary. Students will not handle broken glass by hand. All broken glass will be placed in a designated broken-glass container for proper disposal.
13. Lab benches and other work surfaces will be cleaned with a disinfecting solution at the beginning and end of each lab period. Disinfectant solution and paper wipes are provided in bottles in the sinks at the lab tables.
14. Do not allow any liquids to contact any electrical equipment or cords. Handle electrical cords with dry hands. Remove electrical plugs by pulling and the plug and not on the cord.
15. Use caution when working with hot plates. The heating surface appears the same whether cool or hot; so assume that the surface is hot. Be sure that the cords do not contact the heating surface. If hot plates are still hot at the end of lab, do NOT return them to the storage area, this will be done once they have cooled.
16. Students will not attempt to clean chemical spills until consulting with the instructor.
17. All biological waste will be placed/disposed of in approved, designated containers.
18. The lab bench sinks will be used for liquid disposal only unless different and specific collection methods have been specified.
19. All solid waste will be placed/disposed of in approved and designated containers.
20. Emergency equipment, including emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets, will not be obstructed at any time and used only as intended.
21. In case of an alarm requiring evacuation, all equipment will be shut off, and everyone will exit the lab in accordance with evacuation maps posted at the exits to the labs. No re-entry will be allowed until the emergency event is declared over.
22. Microscopes and other equipment will be stored in approved cabinets when not being actively used.
23. Any work outside of assigned laboratory times must be approved by your instructor.
24. All models must be handled with care. Do not point out structures or mark on the models with a pen or pencil. Use the designated pointer sticks for that purpose.
25. Models will be put away properly. All models will be assembled correctly prior to being placed in their designated storage locations.
26. Do not remove any laboratory equipment such as slides, models, or supplies from the lab. They are for use in the lab only. The TLCC has many biological models, slides and microscopes for student use.
27. Conduct yourself quietly in the laboratory, avoid crowding and haste, and maintain an environment free of clutter, distraction, and disruptions. Carefully follow instructions for the use of specialized equipment and ask for help when necessary. Keep your work area clean and return special items to their original location. Always properly label solutions, tubes, slides, drawings, etc.
28. Turn off all equipment if you leave the lab at any time, and at the end of lab. Check to see that all water faucets and gas outlets are turned off before you leave the lab.

29. If a computer was used during the lab, do NOT store any information on the computer. At the end of the lab, turn off the computer, return it to its proper location on the cart, and plug it in.

I have reviewed and understand these rules. I further understand that it is my individual responsibility to adhere to these rules at all times while performing lab activities.

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(Printed Name)

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(Signature)

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(Date)

*Note: Parent or legal guardian signature is required for any student under the age of 18.*

## Appendix F

**Polk State College Laboratory Safety Rules  
Chemistry Labs**

Maintaining a safe and healthy learning environment is an expectation of all students and instructors. The requirements listed below are the minimum expectations to be adhered to; additional requirements may be required for certain experiments and activities.

1. All spills, accidents and injuries, regardless how minor, will be immediately reported to the instructor.
2. Immediately report any equipment failure to your instructor,
3. Direct contact with any corrosive material will be immediately flushed with copious amounts of water.
4. Any personal medical concerns that compromise your safety (such as, but not limited to, seizure disorder, pregnancy, etc.) should be discussed with the instructor in advance of performing experiments.
5. No food, drinks, chewing gum, or tobacco products are allowed to be present in lab areas. Application of cosmetics is also prohibited.
6. Hair shoulder length or longer will be restrained behind or on top of the head.
7. Covered leather shoes with socks must be worn in order to participate in lab. Sandals, Crocs, or flip-flops are prohibited.
8. Pants or long skirts that completely cover the leg are required in order to participate in the lab.
9. Hands will be thoroughly washed after handling any chemicals.
10. No children, guests, or other students are allowed without expressed approval of the instructor.
11. Do not allow any liquids to contact any electrical equipment or cords. Handle electrical cords with dry hands. Remove electrical plugs by pulling on the plug and not on the cord.
12. Use caution when working with hot plates. The heating surface appears the same whether cool or hot; so assume that the surface is hot. Be sure that the cords do not contact the heating surface. If hot plates are still hot at the end of lab, do NOT return them to the storage area, this will be done once they have cooled.
13. Do not sit on laboratory tables.
14. Approved chemically resistant gloves will be worn as required. Eye protection is required for all wet chemistry activities. Eye protection will consist of approved safety goggles. Contact lenses are prohibited.
15. Broken glass will be immediately cleaned by utilizing a broom, dustpan and mop as necessary. Students will not handle broken glass by hand. All broken glass will be placed in a designated broken-glass container for proper disposal.
16. Lab benches, equipment and other work surfaces will be immediately cleaned upon completion of work.
17. Students will not attempt to clean chemical spills until consulting with the instructor.
18. The lab bench sinks will be used for liquid disposal only unless different and specific collection methods have been specified.
19. All solid waste will be disposed of in approved and designated containers.
20. Emergency equipment, including emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets, will not be obstructed at any time and used only as intended.
21. In case of an alarm requiring evacuation, all equipment will be shut-off, and everyone will exit the lab in accordance with evacuation maps posted at the exits to the labs. No re-entry will be allowed until the emergency event is declared over.
22. Heating devices such as Bunsen burners will only be used when authorized by the instructor. Bunsen burners and other flames should not be left unattended.
23. When performing experiments utilizing heat sources, always inspect equipment prior to heating for cracks, remain in attendance at all times, ensure the chemical is not heated in a closed system and point test tubes or separatory funnels away from all personnel.
24. Never pipette liquids by mouth. Bulbs or other devices must be used.
25. Never directly smell a chemical. When instructed, fan or waft the chemical vapors toward your nose by hand.
26. Always add acid to water, never the reverse.
27. Any work outside of assigned laboratory times must be approved by your instructor.
28. Do not deviate from lab procedures or attempt unauthorized experiments.
29. When inserting a thermometer or any other glass piece through a stopper or plastic thermometer holder, lubricate thoroughly with grease, glycerin, or a proper lubricant. Conduct yourself quietly in the laboratory, avoid crowding and haste, and maintain an environment free of clutter, distraction, and disruptions. Carefully follow instructions for the use of specialized equipment and ask for help when necessary. Keep your work area clean and return special items to their original location. Always properly label solutions, tubes, slides, drawings, etc.





## Appendix G

**Polk State College Laboratory Safety Rules  
Oceanography and Physical Science Labs**

Maintaining a safe and healthy learning environment is an expectation of all students and instructors. The requirements listed below are the minimum expectations to be adhered to; additional requirements may be required for certain experiments and activities.

1. All accidents and injuries, regardless how minor; will be immediately reported to the instructor.
2. Immediately report any equipment failure to your instructor.
3. Any personal medical concerns that compromise your safety will be discussed with the instructor.
4. No food, drinks, gum, or tobacco products are allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair shoulder length or longer will be restrained behind or on top of the head.
6. Loose clothing or jewelry that could get caught in equipment will be removed, restrained, or secured.
7. Covered shoes must be worn in order to participate in lab. No sandals, Crocs, or flip-flops.
8. No children, guests, or other students are allowed without expressed approval of the instructor.
9. Do not sit on laboratory tables.
10. Do not allow any liquids to contact any electrical equipment or cords. Handle electrical cords with dry hands. Remove electrical plugs by pulling on the plug and not on the cord.
11. Use caution when working with hot plates. The heating surface appears the same whether cool or hot; so assume that the surface is hot. Be sure that the cords do not contact the heating surface. If hot plates are still hot at the end of lab, do NOT return them to the storage area, this will be done once they have cooled.
12. Personal Protective Equipment such as gloves, glasses, UV resistant eyewear or goggles will be worn as required. Specific requirements will be defined by the instructor for each experiment.
13. Lab benches and other work surfaces will be immediately cleaned upon completion with work.
14. All wastes will be disposed of in accordance with approved and designated methods.
15. Emergency equipment, including emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets, will not be obstructed at any time and used only as intended.
16. In case of an alarm requiring evacuation, all equipment will be shut off, and everyone will exit the lab in accordance with evacuation maps posted at the exits to the labs. No re-entry will be allowed until the emergency event is declared over.
17. When experiments involve any source of energy such as steam, electricity, radiological sources, students must be present with the experiment at all times, and the specific requirements defined by the instructor will be adhered to.
18. Any work outside of assigned laboratory times must be approved by your instructor.
19. Do not deviate from lab procedures or attempt unauthorized experiments.
20. Conduct yourself quietly in the laboratory, avoid crowding and haste, and maintain an environment free of clutter, distraction, and disruptions. Carefully follow instructions for the use of specialized equipment and ask for help when necessary. Keep your work area clean and return special items to their original location. Always properly label solutions, tubes, slides, drawings, etc.
21. Turn off all equipment if you leave the lab at any time, and at the end of lab. Check to see that all water faucets and gas outlets are turned off before you leave the lab.
22. If a computer was used during the lab, do NOT store any information on the computer. At the end of the lab, turn off the computer, return it to its proper location on the cart, and plug it in.

I have reviewed and understand these rules. I further understand that it is my individual responsibility to adhere to these rules at all times while performing lab activities.

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(Printed Name)

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(Signature)

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(Date)

*Note: Parent or legal guardian signature is required for any student under the age of 18.*

Appendix H  
**Polk State College Laboratory Safety Rules**  
**Microbiology**

Maintaining a safe and healthy learning environment is an expectation of all students and instructors. The requirements listed below are the minimum expectations to be adhered to; additional requirements may be required for certain experiments and activities.

1. All spills, accidents, and injuries, regardless how minor, will be immediately reported to the instructor.
2. Immediately report any equipment failure to your instructor.
3. Any personal medical concerns that compromise your safety will be discussed with the instructor.
4. No food, drinks, gum, or tobacco products are allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair shoulder length or longer will be restrained behind or on top of the head.
6. Covered shoes must be worn in order to participate in lab. No sandals, Crocs, or flip-flops.
7. Pants or long skirts that completely cover the leg are required in order to participate in the lab.
8. Hands will be thoroughly washed upon after handling any chemicals, biohazardous materials, microorganisms and preserved specimens.
9. No children, guests, or other students are allowed without expressed approval of the instructor.
10. Do not allow any liquids to contact any electrical equipment or cords. Handle electrical cords with dry hands. Remove electrical plugs by pulling on the plug and not on the cord.
11. Use caution when working with hot plates. The heating surface appears the same whether cool or hot; so assume that the surface is hot. Be sure that the cords do not contact the heating surface. If hot plates are still hot at the end of lab, do NOT return them to the storage area, this will be done once they have cooled.
12. Do not sit on laboratory tables.
13. Approved chemically resistant gloves will be worn when there is a potential to contact harmful materials such as chemicals, serum, body substances, microorganisms, and preserved specimens.
14. Eye protection is required whenever splashes, sprays, droplets, or aerosols may be generated from hazardous materials, body fluids, microorganism cultures and during dissections. Eye protection will consist of approved safety goggles. Contacts are prohibited.
15. Broken glass will be immediately cleaned by utilizing a broom, dustpan and mop as necessary. Students will not handle broken glass by hand. All broken glass will be placed in a designated broken-glass container for proper disposal.
16. Lab benches, equipment and other work surfaces will be immediately cleaned with a disinfecting solution upon completion with work. Disinfectant solution and paper wipes are provided in bottles in the sinks at the lab tables.
17. Students will not attempt to clean biological/chemical spills until consulting with the instructor.
18. The lab bench sinks will be used for liquid disposal only unless different and specific collection methods have been specified.
19. All solid waste, including biohazardous materials, will be disposed of in approved and designated containers.
20. Emergency equipment, including emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets, will not be obstructed at any time and used only as intended.
21. In case of an alarm requiring evacuation, all equipment will be shut off, and everyone will exit the lab in accordance with evacuation maps posted at the exits to the labs. No re-entry will be allowed until the emergency event is declared over.
22. Heating devices such as Bunsen burners will only be used when authorized by the instructor. All heated items will be handled with tongs or test tube holders.
23. When performing experiments utilizing heat sources, always inspect equipment prior to heating for cracks, remain in attendance at all times, ensure the chemical is not heated in a closed system, and point test tubes away from all personnel.
24. Never pipette liquids by mouth. Bulbs or other devices must be used.
25. Any work outside of assigned laboratory times must be approved by your instructor.
26. Do not deviate from lab procedures or attempt unauthorized experiments.
27. Do not remove laboratory equipment such as slides, models, or supplies from the lab.
28. Conduct yourself quietly in the laboratory, avoid crowding and haste, and maintain an environment free of clutter, distraction, and disruptions. Carefully follow instructions for the use of specialized equipment and ask for help when necessary. Keep your work area clean and return special items to their original location. Always properly label solutions, tubes, slides, drawings, etc.
29. Turn off all equipment if you leave the lab at any time, and at the end of lab. Check to see that all water faucets and gas outlets are turned off before you leave the lab.

