



POLK  
STATE  
COLLEGE

# Chemical Hygiene Plan

Office of Risk Management and Safety

**EMERGENCY PHONE NUMBERS**

The following departments can be contacted concerning safety and security matters at any facility that is owned or operated by Polk State College:

**COLLEGE SECURITY DEPARTMENT 863.297.1059 (ext. 5059)**

***In the case of imminent danger, individuals should dial 911, then contact College Security.***

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	<b>Extension</b>
<b>Director of Risk Management and Safety</b>	5019
<b>Lakeland Campus Chemical Hygiene Officer</b>	6154
<b>Winter Haven Campus Chemical Hygiene Officer</b>	5630
<b>District Director of Facilities</b>	5086
<b>Facilities Plant Manager for the Lakeland Campus</b>	6171
<b>Facilities Plant Manager of the Winter Haven Campus</b>	5360

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## 1.0 **Introduction**

Laboratory safety is an integral part of laboratory activities and is essential to ensuring Polk State College's compliance with all applicable environmental, health, and safety laws; as well as all regulations and requirements. The risks associated with laboratory research (e.g., workplace injuries, environmental incidents, and property losses or damage) are greatly reduced or eliminated when proper precautions and practices are observed in the laboratory. To better manage and mitigate these risks, this *Polk State College Chemical Hygiene Plan* (CHP) is intended to be the cornerstone of the laboratory safety program and is designed to aid faculty, staff, and students in maintaining a safe environment in which to teach. Each laboratory that uses hazardous materials is required to have a copy of the CHP readily available to all laboratory personnel. Each laboratory worker must be familiar with the contents of the CHP and the procedures for obtaining additional information needed to perform their duties safely.

## 2.0 **Purpose**

The purpose of this document is to promote the safety and protection of all staff and students working with chemicals in the laboratory. The information and precautions in the *Polk State College Chemical Hygiene Plan* are compatible with current knowledge and regulations.

## 3.0 **Scope**

The *Polk State College Chemical Hygiene Plan* applies to all employees and students performing activities in the Anatomy & Physiology, Biology, Chemistry, Oceanography, and Physics laboratories of the Winter Haven and Lakeland campuses as well as all Polk State centers.

## 4.0 **Definitions**

The following list of terms describe various chemical properties and processes discussed in this document.

- 4.1 **Action level** - This is a concentration designated in Title 29 of the *Code of Federal Regulations* (CFR), Part 1910, for a specific substance, calculated as an 8-hour, time-weighted average, and initiates certain required activities.
- 4.2 **ANSI**- This is the established acronym for the American National Standards Institute.
- 4.3 **Chemical Hygiene Officer** - This Polk State College employee is qualified by training or experience to provide technical guidance in the development and implementation of the *Polk State College Chemical Hygiene Plan*.
- 4.4 **Chemical Hygiene Plan** - This is a written document that sets forth procedures for equipment, personal protective devices, and work practices that are capable of protecting employees from the health hazards presented by chemicals used in the laboratory.
- 4.5 **Combustible liquid** - This is a liquid with a flashpoint at or above 140°F (60°C).
- 4.6 **Compressed gas** - This is 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** - This term describes an area that may be used to work with select carcinogens, reproductive toxins, or substances that have a high degree of acute toxicity. A designated area may include an entire laboratory or refer to a portion therein.
- 4.8 **Emergency** - An emergency is a situation that poses an immediate threat to human life or could cause serious damage to property.
- 4.9 **Employee** – A full-time or part-time worker at Polk State College is referred to as an employee in this manual.
- 4.10 **Explosive** - These are substances or mixtures that react chemically to rapidly release tremendous energy; explosives, pyrotechnics, and propellants are subclasses of these materials.
- 4.11 **Flammable** – As defined by the Occupational Safety and Health Administration (OSHA), a flammable is any liquid having a flash point below 100°F (37.8°C); or 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 flammable gas is one 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, projects a flame more than 18 inches beyond the ignition source with the valve fully opened, or produces a flame that lashes back and burns at the valve with any degree of valve opening.
- 4.13 **Flammable liquids** - A flammable liquid is one with a flashpoint below 100°F (37.8°C).
- 4.14 **Flammable solid** - This refers to a solid that is liable to cause a fire through friction, absorption of moisture, 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** – This is the lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture with air and produce a flame when a source of ignition is present.
- 4.16 **Hazardous chemical** – This refers to a chemical for which there is statistically significant evidence (i.e., 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 use of hazardous chemicals occurs. More specifically, it is a workplace where relatively small quantities of hazardous chemicals are used in a non-production basis.
- 4.18 **Laboratory scale** - This term describes work 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** - This refers to handling or use of chemicals in which all of the following conditions are met: 1) chemical manipulations are carried out on a laboratory scale, 2) multiple chemical procedures or chemicals are used, 3) the procedures

involved are not part of a production process, 4) protective laboratory practices and equipment are available and in common use to minimize chemical exposure.

- 4.20 **Laboratory worker** - This term refers to an individual employed in a laboratory workplace that may be exposed to hazardous chemicals in the course of performing his or her work duties.
- 4.21 **Organic peroxide** - An organic peroxide is an organic compound that contains the bivalent -OO- structure; it 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 **OSHA** - The commonly used acronym for the Occupational Health and Safety Administration.
- 4.23 **Oxidizer** - An oxidizer is a material that may cause the ignition of combustible materials without the aid of an external source of ignition; or a substance in which, when mixed with combustible materials, increases the rate of burning of these materials when the mixtures are ignited.
- 4.24 **Physical hazard** - A physical hazard is one that arises from the material, structural, or operational factors of the facility or structure itself, apart from the persons owning or managing it.
- 4.25 **Permissible exposure limit (PEL)**- This refers to the acceptable permitted exposure to any material as defined by OSHA in *Table Z-1, Z-2, and Z-3 of the Code of Federal Regulations (CFR) 1910.1000: Air Contaminants*.
- 4.26 **Personal protective equipment (PPE)** - These are devices (e.g., safety goggles, face shields, chemical aprons, gloves) worn by an individual to protect against hazards encountered in the work environment.
- 4.27 **Reproductive toxins** - Reproductive toxins are chemicals that affect the reproductive capabilities of an individual through chromosomal damage (e.g., mutations), injury to a fetus (e.g., teratogenesis), and other methods.
- 4.28 **SDS** - This is an acronym for the *Safety Data Sheet* (formerly known as Material Safety Data Sheets) that communicates the hazards associated with a chemical product. An SDS must accompany each chemical product, and is required documentation for laboratories, manufacturers, and distributors.
- 4.29 **Select carcinogen** - A select carcinogen is any substance that meets any of the following criteria: 1) It is regulated by OSHA as a carcinogen; 2) It is listed under the Known Carcinogen Category in the most recently published National Toxicology Program's (NTP) *Annual Report on Carcinogens*; 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) of the latest release of the International Agency for Research on Cancer's (IARC) *Monographs on the Evaluation of Carcinogenic Risks to Humans*.
- 4.30 **Unstable reaction** - An unstable reaction is one that vigorously polymerizes, decomposes, condenses, or becomes self-reactive under conditions of shock, pressure, or temperature.

- 4.31 **Water-reactive** - This term describes a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

## 5 **Responsibilities**

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

- 5.1 The President of the College has ultimate responsibility for overall safety within the institution and must, with other administrators, provide continuing support for institutional health and safety programs.
- 5.2 The Polk State College Safety Committee is comprised of members representing academic departments and administrative units, as appointed by their respective budget executives. The duties of the committee members are to develop, review, approve, and implement a comprehensive and practical occupational health and safety program.
- 5.3 The Director of Risk Management and Safety shall be responsible for monitoring compliance with and implementation of all safety and environmental regulations. This includes, but is not limited to, regulation interpretation, implementation of programs, planning reviews, facility surveys, and training and educational services. The Director shall have enforcement authority when dealing with unsafe or illegal situations.
- 5.4 The Facilities Department Director shall be responsible for ensuring the maintenance of fume hoods, emergency eyewash and shower equipment, first aid kits, emergency blankets, and fire extinguishers.
- 5.5 The Chemical Hygiene Officer(s) have the following responsibilities:
- 5.5.1 Work with the Director of Risk Management and Safety and other employees to develop and implement appropriate chemical hygiene policies and practices.
  - 5.5.2 Monitor the procurement, use, and disposal of chemicals used in the laboratory.
  - 5.5.3 Monitor the current legal requirements concerning regulated substances.
  - 5.5.4 Seek ways to improve laboratory processes and safety practices
- 5.6 Laboratory Supervisors have the following responsibilities:
- 5.6.1 Ensure that Laboratory Instructors know and follow chemical hygiene rules.
  - 5.6.2 Ensure that protective equipment is available and in working order.
  - 5.6.3 Provide regular, formal chemical hygiene and housekeeping inspections, and ensure that all deficiencies are corrected in a timely manner.
  - 5.6.4 Coordinate with the campus Facilities Department for prompt repair of safety equipment.
  - 5.6.5 Maintain formal inventories of all chemicals and campus storage areas and ensure that *Safety Data Sheets* are compiled and readily available for use by all exposed laboratory personnel and students.
  - 5.6.6 Coordinate waste accumulation and disposal practices for all wastes created by laboratory activities.

- 5.6.7 Know the current legal requirements concerning regulated substances.
- 5.6.8 Coordinate with the appropriate Chemical Hygiene Officer to:
  - 5.6.8.1 Determine the required levels of protective apparel and equipment for all chemicals encountered.
  - 5.6.8.2 Ensure there are adequate facilities and appropriate training related to ordered materials.
- 5.7 Laboratory Instructors (e.g., full-time and part-time faculty) are responsible to:
  - 5.7.1 Plan and conduct each operation in accordance with the chemical hygiene procedures defined in this document.
  - 5.7.2 Develop and apply good chemical hygiene habits.
  - 5.7.3 Understand the hazards of materials being worked with and ensure that safe handling and disposal practices are clearly defined and adhered to.
  - 5.7.4 Report unsafe conditions to the appropriate designated personnel within this plan.
- 5.8 Laboratory Students are responsible to:
  - 5.8.1 Perform all laboratory experiments in accordance with procedures and directions as defined by Laboratory Instructors.
  - 5.8.2 Wear all prescribed personal protective equipment (PPE).
  - 5.8.3 Immediately report any damaged equipment (to include PPE) and immediately assist to remove damaged equipment from service.

## 6 **General Laboratory Procedures**

### 6.1 Laboratory Conduct

Employees and students shall act in a professional manner at all times while in the laboratory. The following behavioral parameters are to be followed:

- 6.1.1 Employees and students shall 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 requires notification of a second on-site party, who shall be responsible for periodically verifying that the operator is safe until the activity has been completed.
- 6.1.4 Visitors to the laboratory must be escorted by an employee and are the responsibility of that employee and must observe all safety regulations. No children under the age of 18 are allowed in the laboratory unless they are enrolled as a student in a Polk State College course.
- 6.1.5 Only well-understood reactions are permitted to run unattended. Lights must be left on and an appropriate sign must be placed on the door indicating that the reaction is in process. Provisions shall be established for containment of toxic substances in the event of a utility service failure during an unattended operation (e.g., containers of cooling water).
- 6.1.6 Injuries, no matter how slight, must be reported immediately to the Laboratory



Supervisor or Laboratory Instructor in accordance with campus procedures. The Laboratory Supervisor or Instructor must notify Campus Security, and Security personnel must complete and retain an incident report.

- 6.1.7 All laboratory employees and students must be advised regarding the procedures for medical, chemical, and power loss emergencies prior to participating in activities within designated areas.
- 6.1.8 All laboratory employees and students must be briefed on the location of emergency equipment and emergency utility shut-off locations prior to initiating any experiments.

## 6.2 Basic Chemical Handling Practices

The following general safety practices should be used when handling chemicals:

- 6.2.1 Direct contact with the skin should be avoided.
- 6.2.2 Smelling or tasting chemicals is prohibited.
- 6.2.3 Individuals may not pipette any chemical by mouth; a vacuum source or bulb must be used.
- 6.2.4 Any apparatus or reaction that has the potential to discharge a toxic chemical must be mechanically exhausted utilizing approved and inspected ventilation equipment.
- 6.2.5 Damaged glassware shall not be used; it must be immediately taken out of service.
- 6.2.6 Equipment shall only be used for its designated purpose.
- 6.2.7 Any first-time demonstration or experiment shall be performed in a controlled trial setting to evaluate the safety and control protocols necessary for the activity.
- 6.2.8 Only designated and approved personnel may access chemical storage rooms to prepare materials for use.

## 6.3 Personal Habits in the Laboratory

Chemicals are often harmful if ingested, placed in contact with the skin, or inhaled. Many chemicals are flammable, combustible, or otherwise hazardous. The following personal habits maintain the safety of the laboratory, protect individuals working in the laboratory, and reduce the chance for dissemination of chemicals outside of the confines of the experimental environment:

- 6.3.1 Eating, drinking, gum chewing, and the application of cosmetics are not permitted in the laboratory. Storage of these same items in the laboratory is also prohibited.
- 6.3.2 Smoking is prohibited in any laboratory environment in accordance with campus policy. Storage of these same items within the laboratory is prohibited.
- 6.3.3. Storage of food and drinks in refrigerators designated for chemicals is prohibited.
- 6.3.4 Hands must be washed before using the restroom, eating, drinking, or smoking. All exposed skin that has potentially been exposed to chemicals must be washed prior to eating and at the end of an individual's shift.
- 6.3.5 Hair that is shoulder-length or longer must be secured. Wearing loose clothing or contact lenses in the laboratory is prohibited.

6.3.6 There are minimum personal clothing requirements when a significant chemical hazard, biological hazard, or other hazardous activity is occurring in the room. These clothing requirements include:

6.3.6.1 Shoes must completely cover the foot and have flat soles.

6.3.6.2 Socks must be worn.

6.3.6.3 The individual must wear full-length pants or an ankle-length dress.

6.3.6.4 Shirts must have sleeves and not expose the midriff.

6.3.6.5 Laboratory coats or chemical protective aprons must be worn if there is a potential for chemical splashes.

6.3.6.6 ANSI-approved safety glasses with side shields, or approved chemical goggles, must be worn if the potential for splash exists.

6.3.6.7 Face shields or goggles must be worn when handling or transferring any corrosive materials.

#### 6.4 Material Handling and Lifting

Equipment and chemicals associated with a laboratory often require special procedures for movement and transport. Before moving any item, the load weight must be determined. If the item is bulky or awkward, two people should jointly move the load. The following additional guidelines apply to movement and transport of materials:

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 All hazardous materials containers must be conspicuously labeled regarding contents and hazards.

6.4.3 When 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.

#### 6.5 Housekeeping

Cleanliness is paramount within a laboratory environment. Areas are to be kept clean and uncluttered to prevent spillage, breakage, personal injury, and unnecessary contact with chemicals. Additionally:

6.5.1 Contaminated glassware shall not to be left out.

6.5.2 Spills must be immediately cleaned from work areas and floors.

6.5.3 Floors must be kept dry at all times.

6.5.4 Doorways and walkways shall not be blocked or used for storage. Doors to chemistry laboratories must remain closed.

6.5.5 Access to exits, emergency equipment, and utility controls must never be blocked.

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

6.5.7 Stairways and hallways are not to be used for storage.

7 **Chemical Procurement, Distribution, and Storage**

7.1 Chemical Procurement

The Laboratory Coordinator is responsible for purchasing chemicals, and both the Campus Chemical Hygiene Officer and Director of Risk Management and Safety are responsible for jointly approving the purchase of any hazardous material. Additionally, the following requirements must be followed:

- 7.1.1 Quantities of materials requested must be limited to foreseeable use during the Academic Year.
- 7.1.2 Before a substance is received, information on proper handling, storage, and disposal must be reviewed by those who plan to handle it.
- 7.1.3 A *Safety Data Sheet* (SDS) must accompany all hazardous materials during transport.
- 7.1.4 No container can be accepted without an adequate identifying label. All labels shall be dated and labeled at the time of receipt.

7.2 Chemical Distribution

Each Polk State College Campus shall purchase chemicals for its own use. Toxic, flammable, and corrosive materials shall not be transported between campuses. The following guidelines relate to the transport of chemicals between and among laboratories:

- 7.2.1 When a highly toxic, corrosive, or flammable chemical is hand-carried between laboratories and stockrooms, the container shall be placed in a appropriate secondary container.
- 7.2.2 If an elevator is used to transport chemicals, handlers shall not ride in the elevator with the chemicals. One person must send the shipment through the elevator while a second person waits to receive it.
- 7.2.3 In limited situations and with the approval of a Chemical Hygiene Officer and the Director of Risk Management and Safety, a chemical with no potential for severe hazard can be packaged and sent through the Facilities Department to a different campus. In these cases, the following must be adhered to:
  - 7.2.3.1 An SDS shall accompany any chemical transported off campus.
  - 7.2.3.2 Materials shall be packed using separate containers to minimize the potential for spills or breaks.
  - 7.2.3.3 All liquid materials shall be packed within appropriate secondary containers or with absorbent material sufficient to contain all of the contents of the container.

7.3 Stockroom Chemical Storage

Access to chemical storage rooms shall be restricted to those personnel approved by a Chemical Hygiene Officer or the Director of Risk Management and Safety. Storage areas shall remain locked to prevent unauthorized traffic. Additionally:

- 7.3.1 Storage of concentrated acids and bases shall be limited to a maximum of 100 milliliters of each product (unless the product is stored in an approved and

- appropriately rated storage cabinet for corrosives).
- 7.3.2 Flammable materials shall be stored within approved storage cabinets. Flammables kept outside of cabinets should be stored within approved safety cans.
  - 7.3.3 Special shipping containers shall be utilized as appropriate.
  - 7.3.4 When possible, original shipping packages for products (e.g. acids and bases) should be stored in styrofoam cubes.
  - 7.3.5 All chemicals shall be dated upon receipt.
  - 7.3.6 A permanent and perpetual inventory of all chemicals shall be maintained.
  - 7.3.7 All chemicals shall 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 of the Chart is found in Appendix A of this document. If the material is not listed in Appendix A of this document, the Laboratory Coordinator must contact Flinn Scientific to obtain the correct classification and storage-pattern location.
  - 7.3.8 Incompatible chemicals must not be stored together. Appendix B provides an overview of potentially incompatible items.
  - 7.3.9 Chemicals shall not be stored on shelves above eye level.
  - 7.3.10 The storage area and cabinets must be labeled to identify the hazardous nature of the products stored within.
  - 7.3.11 Fire extinguishers must be provided in each storage room. Extinguishers must also be of the appropriate size and type to address the type and scale of the combustible and flammable materials that may potentially be encountered.
  - 7.3.12 An approved eyewash station and fire blanket must be located within 25 feet of each chemical storage area.
  - 7.3.13 Shelving sections must be secured to the walls or floor to prevent tipping of entire sections.
  - 7.3.14 Shelves must be equipped with lips to prevent products from rolling off.
  - 7.3.15 Chemicals must not be stored in the aisle except in approved shipping containers.
  - 7.3.16 The storage area must be ventilated by at least four changes of air per hour. Ventilation exhaust shall be isolated to the chemical storage area.
  - 7.3.17 No unlabeled products shall be stored.
  - 7.3.18 Exits must be entirely open and free of hazardous materials.
  - 7.3.19 Water-reactive products (e.g., sodium metal, potassium metal) must be stored under dry oil or kerosene.
  - 7.3.20 Spill cleanup supplies (e.g., neutralizing chemicals and absorbent materials) must be kept readily available and address the type and quantity of the materials in storage.
  - 7.3.21 Emergency telephone numbers shall be posted in the chemical storage area.
  - 7.3.22 No sources of open flame or ignition are allowed within the chemical storage areas.

- 7.3.23 Stockrooms and storerooms shall not be used as preparation or repackaging areas.
- 7.3.24 Metal shelving and shelving parts shall be checked periodically for damage from corrosive vapors.
- 7.3.25 Each shelf shall be organized such that the smaller containers are placed near the front and the larger containers toward the back to minimize the possibility of spills or breakage.
- 7.3.26 Special care must be taken to safely store peroxide-forming chemicals (e.g., ether, liquid paraffin, and olefin), as these form peroxides on exposure to air and light. Peroxides are extremely sensitive to shock, sparks, or other forms of accidental ignition (i.e., even more sensitive than primary explosives such as TNT). Since these chemicals are packaged in an air-based atmosphere, peroxides can form even though the containers have not been opened. Unless the chemical manufacturer added an inhibitor, sealed containers of ethers must be discarded after one year. Opened containers of ethers must also be discarded within one year of opening. All such containers should be dated upon receipt and upon opening.

#### 7.4 Laboratory Storage

As a general rule, the amount of a chemical stored in a laboratory shall be as small as practical and appropriate to its anticipated, immediate use. Additionally:

- 7.4.1 Chemicals shall not be stored on laboratory bench tops or in fume hoods.
- 7.4.2 Steps shall be taken to avoid exposure of chemicals to heat or direct sunlight.

## 8 **Chemical Labeling**

All hazardous chemicals throughout the College must be properly labeled. The existing manufacturer's label must not be removed, altered or defaced. If the original label must be replaced, it must contain the same information as the original label. Labels, as required by the *Occupational Safety and Health Act (OSHA) Hazard Communication Standard 1910.1200*, must contain the following information: 1) the manufacturer's name, address and phone number; 2) a product identifier; 3) signal word(s) (e.g., warning, danger); 4) hazard statement(s); 4) associated pictogram(s); and 5) precautionary statement(s).

- 8.1 The labeling requirement listed in Section 8 of this document does not apply to student-assigned unknown chemicals for analysis; however, hazard information must be provided with all unlabeled chemicals within student laboratories.
- 8.2 The labeling of hazardous chemicals in a laboratory is specified by the *OSHA Laboratory Standard, 1910.1450*. If chemicals are transferred to a secondary container in laboratory, the new container must have the chemical name (i.e., chemical formulas are not appropriate) and, if possible, the physical or health hazard in words or symbols. The SDS for each chemical must be available to laboratory employees.
- 8.3 If an employee transfers hazardous chemicals from a labeled container to a portable container that is only intended for immediate use by that employee, no labels are required

for the portable container; however, the individual must carefully read all of the information on the label and contact the supervisor if any clarification is needed regarding the SDS.

- 8.4 Containers that hold carcinogens, reproductive hazards or acutely toxic material have special labeling requirements. These include:
  - 8.4.1 All containers that hold carcinogens, reproductive hazards or acutely toxic reagents must be properly labeled concerning the health hazard posed by the chemical.
  - 8.4.2 Most new reagent containers have the chemical's hazard clearly displayed on the label; however, older reagents and containers of solutions that are mixed in the laboratory must be properly labeled by the Laboratory Coordinator. The Laboratory Coordinator may write the hazard class (e.g. carcinogen) on the container or use labels available through the Office of Risk Management and Safety.
- 8.5 Polk State laboratories must utilize the *Hazardous Material Identification System (HMIS)* of labeling along with the *Globally Harmonized System (GHS) of Hazard Communication Pictogram* and any other labels that convey hazards associated with the material (cf. Appendix C).
- 8.6 Laboratories do not need to affix a new label to comply with this section of the *Chemical Hygiene Plan* if the chemical manufacturer's label already conveys this information.
- 8.7 Each individual employee is responsible for ensuring that other employees label the containers appropriately.
- 8.8 Each individual employee shall ensure that chemical labeling is accurate by referencing the SDS and the original container.
- 8.9 No person may remove or deface the labels on containers unless they are immediately and properly relabeled.
- 8.10 Labels must in legible English.
- 8.11 Materials that cannot be individually labeled must have their storage areas labeled.
- 8.12 All containers must have an appropriate label, tag, or marking prominently displayed that indicates the material in the container, and its safety and health hazards.
- 8.13 Portable containers that contain a small amount of chemical need not be labeled if they are to be used immediately during that shift, but must be under the strict control of the person using the product.
- 8.14 All warning labels, tags, etc., must be maintained in legible condition.
- 8.15 Incoming chemicals must be checked for proper labeling.
- 8.16 Labels must be used to identify the contents of all secondary containers, as well as any containers that arrive unlabeled by the manufacturer.
- 8.17 Hazardous Waste Stickers shall be used for on-site hazardous waste and shall be filled out in accordance with local, state, and federal, regulations, including the *Hazardous Material Transportation Act* and US Department of Transportation regulations.
- 8.18 Laboratory personnel training must include instruction on the meanings of all labels and the use of labeling systems.

- 8.19 When solutions are made and internal labels developed for storage containers, the new labels must contain at a minimum the following information: 1) the chemical name and identity, 2) the name of the individual who prepared the substance (initials), 3) the date the material was prepared, 4) the concentration of the substance, 5) any hazards associated with the material.

## **9 Student Work Practices**

Students and Laboratory Instructors must work together to ensure the safety of the laboratory environment. It is the responsibility of each laboratory instructor to conduct a safety orientation and discuss the expected work practices prior to any exposure to laboratory hazards. Additionally, the following practices provide a foundation for a safe learning environment:

- 9.1 Instructors are responsible for conducting a safety orientation at the beginning of each semester that includes a review and discussion of the departmental student safety rules and evacuation procedures (cf. Section 9.2), and a review and demonstration of all emergency equipment located in the laboratory.
- 9.2 Each student must review and sign a course-appropriate acknowledgement of the safety rules before exposure to any laboratory hazards. Student safety rules govern the following laboratories:
- Anatomy and Physiology (cf. Appendix D)
  - Biology (cf. Appendix E)
  - Chemistry (cf. Appendix F)
  - Oceanography and Physical Sciences (cf. Appendix G)
  - Microbiology (cf. Appendix H)
- 9.4 Review of the laboratory rules periodically during the semester is recommended.

## **10 Ventilation and Laboratory Exhaust Hoods**

General laboratory ventilation provides airflow into the laboratory from non-laboratory areas and is exhausted to the exterior of the building.

- 10.1 All laboratory doors must remain closed to allow ventilation to operate as designed.
- 10.2 Any reaction that has the potential to produce unpleasant and/or potentially hazardous fumes, vapors, or gases must be performed under a closable fume hood equipped with proper mechanical ventilation and constructed of materials suitable to confine and contain such gases.
- 10.3 Laboratory Hood Operation
- All laboratory hoods must have a minimum capture face velocity of  $100 \pm 20$  feet per minute. When in use, the sash of the hood must be lowered to the designated heights on the hood frame to provide protection. Additionally:
- 10.3.1 All containers and equipment must be kept a minimum of six inches from the back of the hood to ensure proper operation of the hood.

- 10.3.2 Chemicals must not be allowed to vaporize in the hoods as a means of disposal.
- 10.3.3 All hood sashes and panels must be in place before operating.
- 10.3.4 Electrical ignition sources and open flames are not permitted in the hood if combustible or flammable liquids or gases are present.
- 10.3.5 Hoods with a posted inspection date in excess of one year, or hoods with an unfavorable inspection, shall not be utilized.
- 10.3.6 Hoods that are not functioning correctly shall be immediately removed from service and conspicuously labeled: *Do Not Use*. The campus Facilities Department must be notified to repair the equipment.
- 10.3.7 If a hood failure occurs, the following steps must be taken immediately:
  - 10.3.7.1 The sash of the hood must be closed to contain any hazardous vapors or fumes.
  - 10.3.7.2 The emergency fan exhaust switch should be activated (if accessible).
  - 10.3.7.3 All powered equipment should be de-energized and all fuel sources isolated (if they can be accessed without endangering students or employees).
  - 10.3.7.4 Other laboratory students or employees in the work area must be notified of the problem.
  - 10.3.7.5 *Do Not Enter* signs should be placed on the doors, or a designated employee should remain nearby to prevent entry into the laboratory.
  - 10.3.7.6 If necessary, the individual should activate the *Polk State College Emergency Response Plan*.
- 10.4 The campus Facilities Department is responsible for conducting 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. Each hood must be labeled with the inspection date and results. Appropriate sash heights must be marked to ensure that proper capture velocities are maintained.

## **11 Emergency Equipment**

### **11.1 Inspection**

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

11.1.1 The campus Physical Plant Manager shall designate individual(s) within the campus Facilities Department as responsible to conduct monthly inspections.

11.1.2 Each designated individual must communicate any deficiencies to the campus Physical Plant Manager. He or she is responsible to track any deficiencies noted



during the inspection until the issue is resolved.

11.1.3 All monthly inspections must be documented by initialing inspection logs or tags attached to the equipment. If it is impractical to tag the equipment, an inspection log shall be posted as close as practical to the equipment.

#### 11.2 Fire Extinguishers

A licensed and qualified inspector shall be utilized for all annual inspections and servicing of all fire extinguishers. Fire extinguisher locations shall be conspicuously posted, and each fire extinguisher type and size shall be selected such that it is adequate for the hazards present.

#### 11.3 Eyewashes and Showers

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

#### 11.4 Chemical Spill Kits

Chemical spill kits shall be located in all chemical storage and end-use locations. Kits shall be stocked with the appropriate media to address spills of corrosives, bases, mercury, and flammable liquids. All chemical spill cleanup materials shall be stored in a conspicuously posted location that is easily accessible from all areas of the laboratory.

#### 11.5 Emergency Lighting

Emergency lighting must clearly illuminate all aisle ways designated for emergency exit, and all emergency exits must have illuminated signage.

#### 11.6 Alarm Systems

Polk State College uses a variety of emergency systems including strobe lighting and audible alarms that can be triggered using a pull station.

11.6.1 Visual strobe lighting 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 the normal noise levels encountered in the laboratory.

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

11.6.4 The alarm system shall be monitored by an outside, third-party agency in accordance with local fire code.

## 12 **Emergency Spill Procedures**

### 12.1 Chemical Spills and Accidents

When chemicals are to be handled or used, preventive measures must always be considered.

The following guidelines assist in the prevention of spills and accidents: 12.1.1 The experimental procedures used in the laboratory should be designed to minimize spill possibilities, and equipment and materials should be put away as soon as they are no longer needed.

12.1.2 Student chemical handling expectations must be reviewed prior to initiating the

experiment.

- 12.1.3 All students must have direct supervision when performing laboratory activities.
- 12.1.4 Hazardous materials should only be transferred using methods that provide secondary containment that is appropriate for the chemical in use.
- 12.1.5 The *Safety Data Sheet* should be reviewed and consulted prior to use of each chemical.
- 12.1.6 All chemicals must be dispensed and mixed under a fume hood. Only small portions of chemicals should be dispensed into containers for student use. Additionally:

- 12.1.6.1 Large storage bottles or other containers shall not be used.
- 12.1.6.2 Chemicals must be dispensed over a spill containment tray or an absorbent pad.
- 12.1.6.3 A spatula and weigh boat must be used to weigh out chemicals.
- 12.1.6.4 Each container must be closed immediately after obtaining the appropriate quantity.
- 12.1.6.5 Unused chemicals should never be returned to original containers as this may contaminate virgin materials.
- 12.1.6.6 While dispensing a solid chemical, the individual should avoid raising chemical dust and consult the product SDS for information regarding protection from respiratory hazards.
- 12.1.6.7 A stirring rod should be used when pouring liquids to help direct the flow.
- 12.1.6.8 When mixing concentrated solutions, an individual should pour slowly and use care so as not to dump the solutions together. The initial reaction should be observed by mixing a small amount before adding more.

## 12.2 Spill Response and Control

### 12.2.1 Containment and Spill Cleanup Equipment

The following materials and equipment must be available in all chemical storage and handling areas: 1) a mercury spill kit; 2) chemical absorbent kits containing pillows, pads, and loose material approved for chemical absorption; 3) neutralization kits (i.e., one for bases and another for acids); 4) chemically resistant storage containers for storage of used chemical cleanup materials.

## 12.3 Chemical Spill Response Guidelines

### 12.3.1 General Chemical Spill Response

- 12.3.1.1 The individual should quickly assess the spill, its hazards, and the danger to laboratory occupants. Then he or she should notify other lab personnel of the accident and, if necessary, evacuate the area.



- 12.3.1.2 Before leaving the laboratory or cleaning the spill, all sources of ignition and heat should be eliminated if the chemical is flammable (and it is safe to do so).
  - 12.3.1.3 Before attempting to clean the spill, the individual should consult the SDS(s) for the spilled chemical(s), including hazards, spill response procedures, and first aid measures.
  - 12.3.1.4 For major spills, internal spill-response personnel should be contacted through the Security Department (extension 5059).
  - 12.3.1.5 If occupants' safety is at risk, there are injuries, or spill cleanup is beyond the individual's training to safely clean up, he or she should call 911 (i.e., fire department or ambulance).
  - 12.3.1.6 Injured or contaminated persons should be cared for as directed by the SDS. If an individual has been splashed by a chemical that he or she knows to be innocuous, the person may have time contain the spill before cleaning off his or her body.  
*Note: If the safety shower near a chemical spill is used, the shower water may expand the spill area.*
  - 12.3.1.7 All exposed individuals should avoid breathing vapors from the spill; the room should be ventilated before cleaning up if the material is producing heat or giving off vapors.
  - 12.3.1.8 SDS-directed protective equipment must be worn when cleaning the spill.
  - 12.3.1.9 The spill should be contained only when it is safe to approach the area without exposing anyone to risk.
- 12.3.2 General Spill Containment Methods
- 12.3.2.1 Prior to initiating cleanup processes, the material or compound should be identified to determine the substance(s) involved. The SDS provides the required cleanup methods and materials.
  - 12.3.2.2 During cleanup, SDS-designated PPE must be worn.
  - 12.3.2.3 The SDS provides the appropriate absorbent media for the chemical. Absorbent material must be applied in accordance with the instructions for the product. The individual should start application at the outermost edge of the spill and work from the edge to the center of the spilled material.
  - 12.3.2.4 Absorbent materials should be given time to become fully saturated before adding additional materials. If neutralization products are being used, these should be worked into the product with a broom to ensure even distribution.
  - 12.3.2.5 A plastic dustpan and broom can be used to pick up materials. All

recovered materials should be placed in an appropriate chemical-resistant container. Once materials have been contained, the container must be sealed and labeled.

12.3.2.6 All materials used during the spill clean up should be brought to the chemical storage room, and the individual should notify a Chemical Hygiene Officer of the spill and cleanup actions.

12.3.2.7 All materials involved in the cleanup of the spill need to be decontaminated and returned to service (if possible). If materials are consumed during the cleanup of the spill, the Laboratory Coordinator must be informed to replace these materials.

### 12.3.3 Mercury Cleanup Procedures

Mercury is one of the most toxic chemicals found in the environment. It vaporizes at room temperature, producing an invisible, tasteless, odorless, and extremely dangerous vapor. When spilled and left untreated, mercury continues to emit toxic vapor for years. For this reason, the following precautions and procedures are necessary:

12.3.3.1 All laboratory personnel must be made aware of the equipment that contains mercury and use extra caution when using this equipment (e.g., mercury thermometers and sphygmomanometers).

12.3.3.2 A mercury spill kit should be immediately available in laboratory areas where mercury-containing products are used.

12.3.3.3 In the event of a mercury spill:

12.3.3.3.1 All individuals should be evacuated from the spill area.

12.3.3.3.2 The thermostat should be turned down and the room closed off to the rest of the building.

12.3.3.3.3 Individuals should avoid direct-skin-contact. When cleaning a spill, goggles and vinyl (or neoprene) gloves must be worn.

12.3.3.3.4 A mercury spill kit should be used to clean the spill, as it contains material that binds mercury droplets and prevents spreading.

12.3.3.3.5 Mercury beads can be picked up with sticky tape or an eye-dropper (located in the cleanup kit).

12.3.3.3.6 Mercury droplets should be transferred into an unbreakable vapor-tight plastic container. The spill area should be thoroughly examined to ensure that all material has been absorbed. All cleanup materials (including contaminated items) need to be placed in vapor-tight containers.

12.3.3.3.7 Mercury should never be cleaned up using a broom, cloth, or paper towel, as these actions scatter mercury droplets. A vacuum

should also never be used, as this spreads mercury vapors into the air and permanently contaminates the vacuum.

12.3.3.3.8 Household cleaning products should never be used to clean up mercury, as they may react violently with the mercury and release toxic gases.

12.3.3.3.9 All sealed containers with spill contents should be placed under a fume hood. The Laboratory Coordinator should be immediately notified so that he or she can arrange for proper disposal.

## **13 Emergency Medical Procedures**

### **13.1 General Guidelines for Medical Emergencies**

For events that require prompt medical attention, individuals should immediately call 911 and then call the Polk State Security Office (extension 5059). Additionally, any medical treatment should be provided by qualified, first-aid-trained individuals. After exposure to chemicals, an individual should immediately consult the *Safety Data Sheet* for the proper medical-treatment protocol. The SDS should accompany the injured victim during transport to receive formal medical treatment. An injured person should not be moved unless he or she is in further danger from inhalation or skin exposure from the event.

### **13.2 Medical Emergencies Involving Chemicals Spills on the Body**

In the event that a hazardous chemical spills on the body, the individual should quickly remove all contaminated clothing and footwear and immediately flood the affected body area with cold water for at least 15 minutes. Additionally all jewelry should be removed to facilitate removal of any residual material. Chemicals should be washed off with water only—no neutralizing chemicals, creams, lotions, or salves should be used. After exposure to hazardous chemicals, individuals must seek professional medical treatment.

### **13.3 Chemical Splash in the Eye**

In the event that a chemical is splashed into the eye, the individual must irrigate the eyeball and inner surface of eyelid with plenty of cool water for at least 15 minutes. The eye should be forcibly held open to ensure an effective wash. The affected individual should check for and remove contact lenses (if present). Medical treatment should be sought following exposure.

### **13.4 Ingestion of Hazardous Chemicals**

In the event that a hazardous chemical is ingested, the chemical must be identified and its SDS obtained so that information is readily available. Additionally:

13.4.1 An ambulance should be called (i.e., dial 911), before notifying the Polk State Security Office (extension 5059).

13.4.2 The Poison Information Center should be contacted (1.800.222.1222).

13.4.3 Emergency treatment protocols defined by the SDS and Poison Information Center should be followed.

13.4.4 The exposed individual must have professional medical treatment to ensure his or her safety.

13.5 Inhalation of Smoke, Vapors, and Fumes

In the event that smoke, vapors, or fumes contaminate an area, no one should enter the area if there is any possibility that a life-threatening condition still exists, such as oxygen depletion, explosive vapors, or highly toxic gases (e.g., cyanide gas, hydrogen sulfide, nitrogen oxides, and carbon monoxide). Should anyone become overcome with smoke, chemical vapors, or fumes, the individual should be removed to clean air and treated for shock. Anyone exposed should immediately seek professional medical treatment.

13.6 Burning Chemicals on the Clothing

In the event that burning chemicals transfer, the individual should extinguish burning clothing by using the drop-and-roll technique or use fire blankets to smother the fire. Afterwards, emergency treatment protocols outlined in the SDS should be followed and the individual should seek professional medical treatment.

13.7 Fire and Fire-Related Emergencies

In the event of a fire or fire-related emergency (e.g., abnormal heating of material, a flammable gas leak, a flammable liquid spill, presence of smoke, or odor of burning) the following procedures should be used:

13.7.1 First, the building alarm should be activated (i.e., pull the fire station lever). If an alarm is not available or operational, the individual should verbally notify people in the building to initiate evacuation.

13.7.2 The fire department must be contacted (i.e., dial 911). Specific information should be provided regarding the building and room number of the emergency.

13.7.3 The Polk State Security Office should be notified at extension 5059.

13.7.4 Windows and doors should be closed to isolate the area.

13.7.5 Equipment in the immediate area should be shut down (as practical) without creating personal risk.

13.7.6 An individual should only attempt to use a fire extinguisher if: 1) he or she has received fire extinguisher training, and 2) there is an equally trained back-up responder present.

14 **Injury and Illness Reporting**

Polk State College shall investigate all suspected overexposures to chemicals and injuries in a prompt and timely fashion.

14.1 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.

14.2 Potential exposure events may include, but are not limited to: 1) breakage of a chemical container resulting in injury, inhalation of fumes, or exposure to vapors; 2) direct contact

with chemicals resulting in a rash or skin irritation; or 3) symptoms such as nausea, dizziness and headaches (as listed in the SDS for a given chemical).

- 14.3 The Director of Risk Management and Safety, Campus Chemical Hygiene Officer, and the Security Office must be immediately notified of the event and its circumstances.
- 14.4 The supervising individual (e.g., Laboratory Instructor or Laboratory Coordinator) is responsible for contacting the appropriate medical professionals, making arrangements for non-emergency medical care, and informing the Campus Security Office. All acute medical events shall be immediately addressed by utilizing the medical response treatment protocols defined in Section 13 of this document.
- 14.5 All aspects of the event must be thoroughly documented. Completed reports must be forwarded to the Director of Risk Management and Safety and the Campus Chemical Hygiene Officer for review and acceptance.
- 14.6 Polk State College shall provide medical consultation and examination when: 1) any sign or symptom of an overexposure to a chemical is present, 2) monitoring has indicated that an overexposure to a chemical has occurred; or 3) there has been a spill or uncontrolled release of chemical fumes creating exposure and exposure symptoms.
- 14.7 All employee medical examinations and consultations shall be performed or under the direct supervision of a licensed physician and shall be provided without cost and without loss of pay.
- 14.8 Polk State College shall provide the physician with the names of the chemicals used, circumstances of the exposure, and all signs and symptoms of the exposure.
- 14.9 Medical examinations resulting from an overexposure event must be maintained in confidence by the consulting physician and the Chemical Hygiene Officer.
- 14.10 If the Director of Risk Management and Safety and/or Chemical Hygiene Officer determines that a potential for overexposure has occurred to laboratory personnel, medical review shall be extended to these individuals.

## 15 **Training and Information**

- 15.1 Every member of the College community who is engaged in laboratory operations is obligated to participate in the College's Safety Training Program. This obligation may be established by a regulatory agency, a condition of a grant, a College policy, a departmental requirement or as a combination of two or more of these mandates. Safety training course requirements and training frequency can be determined by the supervisor, Human Resources Department, and/or the Director of Risk Management and Safety.
- 15.2 The Office of Risk Management provides a wide range of safety training programs presented in multiple formats, which are dynamic and highlight newly identified hazards, hazard-mitigation strategies, and regulatory requirements in an effort to maintain pace with the ever-evolving landscape of the science laboratory environment. *Laboratory Safety, Chemical Hygiene, Hazard Communication, and Hazardous Waste Management* trainings

are required of all laboratory employees working in a laboratory with chemicals.

- 15.3 Training shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present. It shall also be provided prior to assignments involving new exposure situations. After the initial training, updates may be provided every three years (or more often if needed).
- 15.4 Training records shall be maintained by the Office of Risk Management and Safety.

## 16 **Waste Management and Disposal**

All waste disposal activities must be done under the supervision of a Laboratory Coordinator, who must consult the ScholAR and Flinn chemical disposal references to determine proper separation, accumulation, and disposal methods. Additionally:

- 16.1 Any damaged or broken glassware (e.g., beakers, pipets, flasks, and slides) shall be promptly swept and disposed of in dedicated containers marked *Broken Glass Only*. If chemicals are spilled at the same time that glass is broken, cleanup shall occur in accordance with Section 12 of this document.
- 16.2 All hazardous waste materials shall be placed in the satellite accumulation area as designated by the campus Laboratory Coordinator.
- 16.3 Log sheets shall be maintained in each satellite accumulation point to document the additions of waste to the respective areas.
- 16.4 Logged entries must include (at a minimum) the following information: 1) the date the material was added, 2) a description of the material, 3) the quantity of the material, and 4) the name of the person adding the material.
- 16.5 Use of intermediate accumulation containers in the laboratory area is prohibited (with the exception of designated *Broken Glass Only* containers).
- 16.6 Unknown waste must be handled and disposed of as hazardous waste until subsequent determination or classification verifies that it is non-hazardous.

## 17 **Chemical Handling Procedures**

### 17.1 General Requirements

Laboratory personnel are expected to research and understand the properties of the chemicals being handled. Informational resources include: the SDS, literature in the library, peer consultation, Laboratory Coordinators, and Chemical Hygiene Officers.

### 17.2 Working with Flammable and Combustible Liquids

When working with flammable and combustible liquids, the following hazards must be anticipated:

- 17.2.1 Vapors can create an ignitable mixture in the air.
- 17.2.2 Many flammable liquids are solvents and can create inhalation hazards.
- 17.2.3 Skin contact must be avoided; irritation and skin absorption are common with materials of this nature.



17.2.4 Tissue damage is a common effect of direct contact to skin.

### 17.3 Storage of Flammable Liquids

All flammable liquids must be stored in an approved fire-rated cabinet when not in use.

17.3.1 The maximum amount of materials allowed outside of an approved cabinet in a laboratory or storage area is as follows:

- Class I-A liquids in containers: 25 gallons.
- Class I-B, I-C, Class II, or Class III-A liquids in containers: 120 gallons combined.

17.3.2 The maximum storage in a fire-rated cabinet is as follows:

- Class I or Class II liquids: 160 gallons.
- Class III liquids: 120 gallons.

17.3.3 No more than three cabinets are permitted in an area unless there is a minimum 100-foot separation.

17.3.4 The following are the required controls when working with flammable and combustible liquids:

17.3.4.1 Work shall be performed under an exhaust hood rated for flammables (if practical).

17.3.4.2 When transferring Class I liquids, bonding is required between the two containers.

17.3.4.3 All transfer devices and containers must be rated for the hazard associated with the materials.

### 17.4 Corrosive Liquids

The following hazards should be anticipated in the event that direct contact, inhalation, or ingestion of corrosives occurs: severe irritation of the skin, eyes, mucous membranes, respiratory tract, and digestive track. To prevent these hazards, the following protocols are necessary:

17.4.1 Requirements for storage of corrosive liquids:

17.4.1.1 Concentrated acids and bases must be stored in appropriate drip trays, or plastic carriers if used frequently.

17.4.1.2 Concentrated acids and bases must be transported in plastic carriers.

17.4.1.3 Oxidizing acids (e.g., nitric, sulfuric, perchloric) must be stored away from organic chemicals, paper, wood, or other flammables.

17.4.1.4 Drip tray residue must be removed as immediately as practical.

17.4.1.5 Protective clothing (e.g., laboratory coat or apron, gloves, and goggles) must be worn at all times when working with corrosive liquids.

17.4.1.6 An individual should never add water to a concentrated mineral acid or base.

## 17.5 Compressed Gases

Compressed gas cylinders contain large amounts of energy and can cause serious injury and physical damage. Compressed gasses may also be flammable, toxic, corrosive, or cryogenic.

17.5.1 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.

17.5.2 The following required controls must be met when working with compressed gases:

17.5.2.1 Compressed gasses must be transported with the cap in place and only in a suitable carrier.

17.5.2.2. Only appropriate fittings and regulators may be used; each gas type has special fittings.

17.5.2.3 Gasses on one type must not be permitted to contaminate gasses of another type; check valves and regulators must be used.

17.5.2.4 Valves should be opened slowly and cautiously.

17.5.2.5 Empty cylinders should be returned to storage and clearly marked *MT*.

17.5.2.6 Valves must be closed when the cylinder is not use.

17.5.2.7 Only approved lubricants may be used on cylinders and gas fittings.

17.5.2.8 Gloves must be used when handling cryogenic containers, hoses, and fittings.

## 18. Working with Substances of Moderate to High Chronic Toxicity or High Acute Toxicity

### 18.1 Carcinogens, Mutagens, Teratogens, and Reproductive Toxins

Carcinogens, mutagens, teratogens, and reproductive toxins are highly toxic and pose great danger to those exposed. Use of these substances should be minimized. Handling of these materials should be restricted to experienced and qualified personnel, and should be accomplished according to the following:

18.1.1 At least two people must be present at all times when handling and using these materials. Exposures can potentially induce carcinogenesis, mutagenesis, and adverse reproductive outcomes.

18.1.2 When stored, these materials should be segregated from other materials, and only the minimum quantity necessary for immediate use should be maintained.

18.1.3 The following additional controls are required:

18.1.3.1 All work with these materials should be pre-approved by a Chemical Hygiene Officer and take place only in a designated area.

18.1.3.2 Work must be completed with strict adherence to SDS-directed protective equipment.

18.1.3.3 Adequate engineering controls, such as hoods, glove boxes, etc. must be in place during work with these materials.

18.1.3.4 In the event of a spill, the individual must immediately cleanup and decontaminate all surfaces involved in the spill.

## 18.2 Toxic Metals

Toxic metals are hazardous when inhaled or ingested, and some can be absorbed through the skin or cause irritation. To minimize there risks, specific protocols are necessary.

18.2.1 Storage requirements for toxic metals include the following:

18.2.1.1 All materials must be stored in approved chemical cabinets.

18.2.1.2 When storing, the individual must ensure that toxic metals maintain separation from oxidizing materials.

18.2.1.3 Only the minimum quantity necessary shall be kept on hand.

18.2.2 The following controls must be used with toxic metals:

18.2.1.1 When working with toxic metals, an individual must work under the hood as much as possible.

18.2.1.2 Work must be completed with strict adherence to SDS-directed protective clothing.

18.2.1.3 Spills must be cleaned up immediately, with the work area properly decontaminated.

## 19. **Recordkeeping**

### 19.1 Personal Exposure Monitoring

The Office of Risk Management and Safety shall maintain accurate records of any measurement taken to monitor an employee's exposure to hazards (i.e., for the duration of employment plus 30 years) in accordance with the requirements of OSHA's *Access to Employee and Medical Records Standard* (cf. 29 CFR 1910.1020). The Office of Risk Management and Safety shall also keep any results of routine and non-routine personal and/or area monitoring, as well as evaluations of worker exposures to chemicals due to accidents, spills, fires, or explosions.

### 19.2 Training Records

The Office of Risk Management and Safety shall maintain all employees' training records.

### 19.3 Medical Surveillance/Consultation Records

All occupational health medical examinations shall be kept in the *Employee Confidential File* in the Office of Risk Management and Safety. These records shall be maintained for the duration of the employee's employment, plus 30 years.

### 19.4 Availability of Records

Employees shall have access to their medical records in accordance with OSHA's *Access to Employee and Medical Records Standard* (cf. 29 CFR 1910.1020).

### 19.5 Availability and Annual Review of the *Polk State College Chemical Hygiene Plan*

The *Polk State College Chemical Hygiene Plan* shall be made available to all laboratory personnel via Share Point and/or P:drive. In addition, the CHP shall be available via the College



Website. To determine the effectiveness of the Plan, the Director of Risk Management and Safety, Chemical Hygiene Officers, and laboratory personnel shall conduct periodic laboratory inspections to review laboratory safety practices. The CHP shall be reviewed and updated at least every two years (or more frequently) based on findings, observations, and procedural changes.












## Appendix B Incompatible Chemicals 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	Acids, organic or inorganic
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

Appendix B  
**Incompatible Chemicals Chart (continued)**

<b>CHEMICAL</b>	<b>KEEP OUT OF CONTACT WITH</b>
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
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

## Globally Harmonized System of Classification: Hazard Pictogram

<p><b>Health Hazard</b></p>  <ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Mutagenicity</li> <li>• Reproductive Toxicity</li> <li>• Respiratory Sensitizer</li> <li>• Target Organ Toxicity</li> <li>• Aspiration Toxicity</li> </ul>	<p><b>Flame</b></p>  <ul style="list-style-type: none"> <li>• Flammables</li> <li>• Pyrophorics</li> <li>• Self-Heating</li> <li>• Emits Flammable Gas</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>	<p><b>Exclamation Mark</b></p>  <ul style="list-style-type: none"> <li>• Irritant (skin and eye)</li> <li>• Skin Sensitizer</li> <li>• Acute Toxicity (harmful)</li> <li>• Narcotic Effects</li> <li>• Respiratory Tract Irritant</li> <li>• Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<p><b>Gas Cylinder</b></p>  <ul style="list-style-type: none"> <li>• Gases Under Pressure</li> </ul>	<p><b>Corrosion</b></p>  <ul style="list-style-type: none"> <li>• Skin Corrosion/ Burns</li> <li>• Eye Damage</li> <li>• Corrosive to Metals</li> </ul>	<p><b>Exploding Bomb</b></p>  <ul style="list-style-type: none"> <li>• Explosives</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>
<p><b>Flame Over Circle</b></p>  <ul style="list-style-type: none"> <li>• Oxidizers</li> </ul>	<p><b>Environment (Non-Mandatory)</b></p>  <ul style="list-style-type: none"> <li>• Aquatic Toxicity</li> </ul>	<p><b>Skull and Crossbones</b></p>  <ul style="list-style-type: none"> <li>• Acute Toxicity (fatal or toxic)</li> </ul>



## Chemical Labels-Hazardous Materials Identification System (HMIS)

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

### Health Hazards

- 4 – Severe/Life-Threatening
- 3 – Extreme danger/Major injury
- 2 – Hazardous/Temporary or minor injury
- 1 – Slightly hazardous/Irritation or minor reversible injury
- 0 – No significant health risk





































### Flammability (Fire Hazard)

- 4 – Very volatile liquids/flammable gases; Flash point below 73°F (23°C) & boiling points below 100°F (38°C)
- 3 – Ignitable liquids with flash points point below 73°F (23°C) & boiling points above 100°F (38°C) or liquids with flash points between 73°F (23°C) 100°F (38°C)
- 2 – Liquids with flash points at or above 100°F (38°C) but below 200°F (93°C)
- 1 – Flash points above 200°F (93°C)
- 0 – Material will not burn

### Reactivity (Physical Hazards)

- 4 – Very reactive/High risk of explosion or detonation
- 3 – Moderate risk of explosion or detonation
- 2 – Low risk of explosion or detonation
- 1 – Stable material but may become unstable at high temperatures and pressures
- 0 – Stable material, non-explosive

Appendix C  
**Chemical Labels-Hazardous Materials Identification System (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 Laboratory**

Students and instructors are expected to work collaboratively to maintain a safe and healthy learning environment. Below are the minimum requirements for those participating in laboratory activities. There may be additional requirements for certain experiments.

1. All accidents and injuries, regardless of how minor, must be immediately reported to the instructor.
2. Any equipment failure must be reported to the instructor.
3. Medical concerns that may compromise personal safety must be discussed with the instructor.
4. Food, drinks, chewing gum, tobacco products, food wrappers and containers, including empty ones, are **NOT** allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair that is shoulder-length or longer must be restrained behind the neck or on top of the head.
6. Covered shoes must be worn at all times in the laboratory (e.g., no sandals, Crocs, or flip-flops).
7. No children, guests, or other students are allowed without specific approval from the instructor.
8. Students may not sit on laboratory tables.
9. Gloves must be worn as required. Eye protection is required for all dissections (i.e., approved safety glasses or safety goggles). Contact lenses are prohibited during dissections.
10. Protective apparel is recommended for all wet labs that involve the use of chemical solutions (e.g., staining slides, preserving specimens, performing dissections, use of microorganisms). Dry labs are those that include work with models or bones, or prepared slides and microscopes. After the use of protective apparel, it should be folded inside out for transport prior to leaving the laboratory.
11. Special pipetting devices are provided; never mouth-pipette materials.
12. Electrical cords and equipment must be handled with dry hands and should never come into contact with liquids. Electrical equipment must be unplugged by pulling on the plug, not the cord.
13. Caution should be used when working with hot plates. The heating surface appears the same whether cool or hot, so the student should always assume that the surface is hot. It is essential to maintain cords away from the heating surface. If hot plates are still hot at the end of the laboratory period, they should not be returned to the storage area; this can be done later, once they have cooled.
14. Instructors must be informed in the event of glass breakage. Broken glass must be immediately cleaned utilizing a broom, dustpan, and mop (as necessary) and disposed of in the designated *Broken Glass Container*; broken glass must never be removed by hand.
15. Benches and other work surfaces must be cleaned with a disinfecting solution at the beginning and end of each laboratory period. Disinfectant solution and paper wipes are provided in bottles by the sinks at the laboratory tables.
16. Students shall not attempt to clean chemical spills until consulting with the instructor.
17. Dissected specimens and other biological waste shall be disposed of by wrapping them in absorbent material and then placing them in approved, designated containers.
18. The lab bench sinks must be used for liquid disposal only (unless different collection methods have been specified). Paper and disinfected gloves shall be disposed of in ordinary trash receptacles.
19. All solid waste must be placed in approved and designated containers.
20. Emergency equipment shall not be obstructed at any time and must only be used as intended. This includes emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets.
21. In the case of an alarm requiring evacuation, equipment must be shut off, and everyone must exit the laboratory in accordance with the evacuation maps posted at the exits. No re-entry is allowed until the emergency event is declared resolved. Students must meet with the instructor at the designated meeting area outside, as the instructor must call roll to ensure that all students have evacuated.
22. Microscopes and other equipment must be stored in approved cabinets when not actively in use.

23. Any work done outside of the assigned laboratory times must be approved by the instructor and supervised by Polk State College staff.
24. All models must be handled with care. Pointer sticks are provided to indicate structures; pens and pencils should never be used for this purpose as they mark and damage the models.
25. Models and materials must be put away properly or returned to their designated location when not in use. All models must be assembled correctly before being placed in their designated locations.
26. The laboratory is a place of composed, directed scientific inquiry. Individuals should conduct themselves quietly; avoid crowding and haste; and maintain an environment free of clutter, distraction, and disruptions.
27. Students should carefully follow instructions with the use of specialized equipment and ask for help when necessary. Solutions, tubes, slides, drawings, etc. must be properly labeled and each individual's workspace should be kept clean.
28. Laboratory equipment such as slides, models, or supplies may not be removed from the laboratory for any reason. The TLCC has many biological models, slides, and microscopes for student use.
29. Equipment in use must be turned off any time that the student leaves the laboratory, including at the end of the period. Before leaving, each student should verify that nearby water faucets and gas outlets have been turned off.
30. If a computer is used during the laboratory activities, no information may be stored on the device. At the end of the period, the computer must be turned off, returned to its proper location on the cart, and plugged 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 laboratory activities.

\_\_\_\_\_  
(Printed Name)

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(Signature)

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(Date)

## Appendix E

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

Students and instructors are expected to work collaboratively to maintain a safe and healthy learning environment. Below are the minimum requirements for those participating in laboratory activities. There may be additional requirements for certain experiments.

1. All accidents and injuries, regardless of how minor, must be immediately reported to the instructor.
2. Any equipment failure must be reported to the instructor.
3. Medical concerns that may compromise personal safety must be discussed with the instructor.
4. Food, drinks, chewing gum, tobacco products, food wrappers and containers, including empty ones, are **NOT** allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair that is shoulder-length or longer must be restrained behind the neck or on top of the head.
6. Covered shoes must be worn at all times in the laboratory (e.g., no sandals, Crocs, or flip-flops).
7. No children, guests, or other students are allowed without specific approval from the instructor.
8. Students may not sit on laboratory tables.
9. Gloves must be worn as required. Eye protection is required for all dissections (i.e., approved safety glasses or safety goggles). Contact lenses are prohibited during dissections.
10. Protective apparel is recommended for all wet labs that involve the use of chemical solutions (e.g., staining slides, preserving specimens, performing dissections, use of microorganisms). Dry labs are those that include work with models or bones, or prepared slides and microscopes. After the use of protective apparel, it should be folded inside out for transport prior to leaving the laboratory.
11. Special pipetting devices are provided; never mouth-pipette materials.
12. Electrical cords and equipment must be handled with dry hands and should never come into contact with liquids. Electrical equipment must be unplugged by pulling on the plug, not the cord.
13. Caution should be used when working with hot plates. The heating surface appears the same whether cool or hot, so the student should always assume that the surface is hot. It is essential to maintain cords away from the heating surface. If hot plates are still hot at the end of the laboratory period, they should not be returned to the storage area; this can be done later, once they have cooled.
14. Instructors must be informed in the event of glass breakage. Broken glass must be immediately cleaned utilizing a broom, dustpan, and mop (as necessary) and disposed of in the designated *Broken Glass Container*; broken glass must never be removed by hand.
15. Benches and other work surfaces must be cleaned with a disinfecting solution at the beginning and end of each laboratory period. Disinfectant solution and wipes are provided near the sinks at the laboratory tables.
16. Students shall not attempt to clean chemical spills until consulting with the instructor.
17. All biological waste must be disposed of in approved, designated containers.
18. The bench sinks must be used only for liquid disposal (unless different collection methods have been specified).
19. All solid waste must be placed in approved and designated containers.
20. Emergency equipment shall not be obstructed at any time and must only be used as intended. This includes emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets.
21. In the case of an alarm requiring evacuation, equipment must be shut off, and everyone must exit the laboratory in accordance with the evacuation maps posted at the exits. No re-entry is allowed until the emergency event is declared resolved. Students must meet with the instructor at the designated meeting area outside, as the instructor must call roll to ensure that all students have evacuated.
22. Microscopes and other equipment must be stored in approved cabinets when not actively in use.
23. Any work completed outside of the assigned laboratory times must be approved by the instructor.

24. All models must be handled with care. Pointer sticks are provided to indicate structures; pens and pencils should never be used for this purpose as they mark and damage the models.
25. Models and materials must be put away properly or returned to their designated location when not in use. All models must be assembled correctly before being placed in their designated locations.
26. The laboratory is a place of composed, directed scientific inquiry. Individuals should conduct themselves quietly; avoid crowding and haste; and maintain an environment free of clutter, distraction, and disruptions.
27. Students should carefully follow instructions with the use of specialized equipment and ask for help when necessary. Solutions, tubes, slides, drawings, etc. must be properly labeled and each individual's workspace should be kept clean.
28. Laboratory equipment such as slides, models, or supplies may not be removed from the laboratory for any reason. The TLCC has many biological models, slides, and microscopes for student use.
29. Equipment in use must be turned off any time that the student leaves the laboratory, including at the end of the period. Before leaving, each student should verify that nearby water faucets and gas outlets have been turned off.
30. If a computer is used during the laboratory activities, no information may be stored on the device. At the end of the period, the computer must be turned off, returned to its proper location on the cart, and plugged 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 laboratory activities.

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

## Appendix F

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

Students and instructors are expected to work collaboratively to maintain a safe and healthy learning environment. Below are the minimum requirements for those participating in laboratory activities. There may be additional requirements for certain experiments.

1. Emergency equipment shall not be obstructed at any time and must only be used as intended. This includes emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets.
2. In case of an alarm requiring evacuation, all equipment must be shut off, and everyone must exit the laboratory in accordance with evacuation maps posted at the exits. No re-entry is allowed until the emergency event is declared to be resolved. In addition, all equipment, water faucets, and gas outlets must be turned off any time a student leaves the laboratory, as well as at the end of the laboratory period.
3. Any medical concerns that may compromise personal safety (e.g., seizure disorder, pregnancy) must be discussed with the instructor prior to performing experiments.
4. Food, drinks, chewing gum, tobacco products, food wrappers and containers, including empty ones, are **NOT** allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Approved chemically resistant gloves must be worn as required. Eye protection is required for all wet chemistry activities (i.e., approved safety goggles). Contact lenses are prohibited.
6. Hair that is shoulder-length or longer must be restrained behind the neck or on top of the head.
7. Covered leather shoes with socks must be worn in order to participate in laboratory (e.g., no sandals, Crocs, flip-flops).
8. Pants or long skirts that completely cover the leg are required in order to participate in laboratory activities.
9. Hands must be thoroughly washed after handling any chemicals.
10. No children, guests, or other students are allowed without specific approval from the instructor.
11. All spills, accidents and injuries, regardless how minor, must be immediately reported to the instructor. A student may not attempt to clean a chemical spill until consulting with the instructor. Broken glass must immediately be cleaned using a broom, dustpan, and mop (as necessary) and placed in the receptacle marked *Broken Glass*; broken glass should never be cleaned up by hand.
12. Any equipment failure must be immediately reported to the instructor.
13. When performing experiments utilizing heat sources, the student must always inspect the 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 individuals.
14. Direct contact with corrosive material must be immediately flushed with copious amounts of water.
15. Electrical cords and equipment must be handled with dry hands and should never come into contact with liquids. Electrical equipment must be unplugged by pulling on the plug, not the cord.
16. Caution should be used when working with hot plates. The heating surface appears the same whether cool or hot, so the student should always assume that the surface is hot. It is essential to maintain cords away from the heating surface. If hot plates are still hot at the end of the laboratory period, they should not be returned to the storage area; this can be done later, once they have cooled.
17. Students may not sit on laboratory tables.
18. The bench sinks must be used for only for liquid disposal (unless different collection methods have been specified). All solid waste must be placed in designated containers.
19. Heating devices such as Bunsen burners shall only be used when authorized by the instructor. Bunsen burners and other flames must never be left unattended.
20. Bulbs or other devices must be used to pipette liquids; never mouth-pipette materials.

21. A student must never directly smell a chemical; when instructed, he or she may fan or waft the chemical vapors toward the nose by hand.
22. When required to mix chemicals, the student must always add an acid to water, never the reverse.
23. The student may not deviate from procedures or attempt unauthorized experiments.
24. When inserting a thermometer or any other glass piece through a stopper or plastic thermometer holder, it must first be lubricated thoroughly with grease, glycerin, or a proper lubricant.
25. The laboratory is a place of composed, directed scientific inquiry. Individuals should conduct themselves quietly; avoid crowding and haste; and maintain an environment free of clutter, distraction, and disruptions. The work area should be kept clean with all items returned to their designated locations when not in use.
26. Any work done outside of the assigned laboratory times must be approved by the instructor.
27. Instructions for the use of specialized equipment must be carefully followed, and the student should ask for help when necessary. Solutions, tubes, slides, drawings, etc. must be carefully labeled.
28. If a computer is used during the laboratory activities, no information may be stored on the device. At the end of the period, the computer must be turned off, returned to its proper location on the cart, and plugged 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 laboratory activities.

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)



Appendix G  
**Polk State College Laboratory Safety Rules**  
**Earth Science Laboratory**

Students and instructors are expected to work collaboratively to maintain a safe and healthy learning environment. Below are the minimum requirements for those participating in laboratory activities. There may be additional requirements for certain experiments.

1. All accidents and injuries, regardless of how minor, must be immediately reported to the instructor.
2. Any equipment failure must be reported to the instructor.
3. Medical concerns that may compromise personal safety must be discussed with the instructor.
4. Food, drinks, chewing gum, tobacco products, food wrappers and containers, including empty ones, are **NOT** allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair that is shoulder-length or longer must be restrained behind the neck or on top of the head.
6. Loose clothing or jewelry that could get caught in equipment must be removed, restrained, or secured as required. Specific requirements designated by the instructor must be followed.
7. Covered shoes must be worn in laboratory (e.g., no sandals, Crocs, or flip flops). Some experiments and activities may have additional requirements as specified by the instructor.
8. No children, guests, or other students are allowed without the specific approval of the instructor.
9. Students may not sit on laboratory tables.
10. Electrical cords and equipment must be handled with dry hands and should never come into contact with liquids. Electrical equipment must be unplugged by pulling on the plug, not the cord.
11. Caution should be used when working with hot plates. The heating surface appears the same whether cool or hot, so the student should always assume that the surface is hot. It is essential to maintain cords away from the heating surface. If hot plates are still hot at the end of the laboratory period, they should not be returned to the storage area; this can be done later, once they have cooled.
12. Personal Protective Equipment (PPE) such as gloves, safety glasses, UV-resistant eyewear, or goggles must be worn as required by the instructor.
13. Benches and other work surfaces must be immediately cleaned upon completion of work.
14. All wastes must be disposed of in accordance with approved and designated methods.
15. Emergency equipment shall not be obstructed and must only be used as intended. This includes emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets.
16. In case of an evacuation, all equipment must be shut off, and everyone must exit the laboratory in accordance with evacuation maps posted at the exits. No re-entry is allowed until the emergency event is resolved.
17. When experiments involve sources of energy such as steam or electricity, students must remain present at all times; additional requirements provided by the instructor must be strictly adhered to.
18. Any work completed outside of the assigned laboratory times must be approved by the instructor.
19. A student may not deviate from procedures or attempt unauthorized experiments.
20. The laboratory is a place of composed, directed scientific inquiry. Individuals should conduct themselves quietly; avoid crowding and haste; and maintain an environment free of clutter, distraction, and disruptions. The work area should be kept clean with all items returned to their designated locations when not in use.
21. All equipment must be turned off prior to leaving the laboratory, including at the end of the period. The student must verify that all water faucets and gas outlets are turned off before leaving.
22. If a computer is used during the laboratory activities, no information may be stored on the device. At the end of the period, the computer must be turned off, returned to its proper location on the cart, and plugged in to receive a charge.

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 laboratory activities.

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

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

Students and instructors are expected to work collaboratively to maintain a safe and healthy learning environment. Below are the minimum requirements for those participating in laboratory activities. There may be additional requirements for certain experiments.

1. All accidents and injuries, regardless of how minor, must be immediately reported to the instructor.
2. Any equipment failure must be reported to the instructor.
3. Medical concerns that may compromise personal safety must be discussed with the instructor.
4. Food, drinks, chewing gum, tobacco products, food wrappers and containers, including empty ones, are **NOT** allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair that is shoulder-length or longer must be restrained behind the neck or on top of the head.
6. Covered shoes must be worn at all times in the laboratory (e.g., no sandals, Crocs, or flip-flops).
7. No children, guests, or other students are allowed without specific approval from the instructor.
8. Students may not sit on laboratory tables.
9. Pants or long skirts that completely cover the leg are required for some laboratory exercises.
10. Hands must be thoroughly washed after handling any chemicals, biohazardous materials, microorganisms, or preserved specimens.
11. Electrical cords and equipment must be handled with dry hands and should never come into contact with liquids. Electrical equipment must be unplugged by pulling on the plug, not the cord.
12. Caution should be used when working with hot plates. The heating surface appears the same whether cool or hot, so the student should always assume that the surface is hot. It is essential to maintain cords away from the heating surface. If hot plates are still hot at the end of the laboratory period, they should not be returned to the storage area; this can be done later, once they have cooled.
13. Approved chemically resistant gloves must be worn when there is a potential for contact with harmful materials such as chemicals, serum, body substances, certain microorganisms, and preserved specimens.
14. Eye protection (i.e., safety goggles) is required whenever splashes, sprays, droplets, or aerosols may be generated from hazardous materials, body fluids, microorganism cultures, and dissections. Contact lenses are prohibited.
15. Instructors must be informed in the event of glass breakage. Broken glass must be immediately cleaned utilizing a broom, dustpan, and mop (as necessary) and disposed of using the designated *Broken Glass Container*; broken glass must never be removed by hand.
16. Benches, equipment and other work surfaces must be cleaned with a disinfecting solution upon completion of work. Disinfectant solution and wipes are provided next to the sinks at the tables.
17. Students must never attempt to clean biological or chemical spills until consulting with the instructor.
18. The bench sinks are used only for liquid disposal (unless different collection methods have been specified).
19. All solid waste, including biohazardous materials, must be disposed of in approved and designated containers.
20. Emergency equipment shall not be obstructed at any time and must only be used as intended. This includes emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets.
21. In the case of an alarm requiring evacuation, equipment must be shut off, and everyone must exit the laboratory in accordance with the evacuation maps posted at the exits. No re-entry is allowed until the emergency event is declared to be resolved. Students must meet with the instructor at the designated meeting area outside, as the instructor must call roll to ensure that all students have evacuated.
22. Heating devices such as Bunsen burners shall only be used when authorized by the instructor. All heated items must be handled with tongs or test tube holders.

23. When performing experiments utilizing heat sources, the student must always inspect the 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 individuals.
24. Bulbs and other devices are provided to pipette liquids; never mouth-pipette materials.
25. Any work done outside of the assigned laboratory times must be approved by the instructor.
26. The student may not deviate from procedures or attempt unauthorized experiments.
27. Laboratory equipment such as slides, models, or supplies may not be removed from the laboratory for any reason. The TLCC has many biological models, slides, and microscopes for student use.
28. The laboratory is a place of composed, directed scientific inquiry. Individuals should conduct themselves quietly; avoid crowding and haste; and maintain an environment free of clutter, distraction, and disruptions. The work area should be kept clean with all items returned to their designated locations when not in use.
29. The student should carefully follow all instructions for the use of specialized equipment and ask for help if necessary. Solutions, tubes, slides, drawings, etc. must be properly labeled.
30. Equipment in use must be turned off any time that the student leaves the laboratory, including at the end of the period. Before leaving, each student should verify that nearby water faucets and gas outlets have been turned off.
31. If a computer is used during the laboratory activities, no information may be stored on the device. At the end of the period, the computer must be turned off, returned to its proper location on the cart, and plugged 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 laboratory activities.

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

Appendix I  
**Polk State College Laboratory Safety Rules**  
**Physical Science Laboratory**

Students and instructors are expected to work collaboratively to maintain a safe and healthy learning environment. Below are the minimum requirements for those participating in laboratory activities. There may be additional requirements for certain experiments.

1. All accidents and injuries, regardless of how minor, must be immediately reported to the instructor.
2. Any equipment failure must be reported to the instructor.
3. Medical concerns that may compromise personal safety must be discussed with the instructor.
4. Food, drinks, chewing gum, tobacco products, food wrappers and containers, including empty ones, are **NOT** allowed to be present in lab areas. Application of cosmetics is also prohibited.
5. Hair that is shoulder-length or longer must be restrained behind the neck or on top of the head.
6. Loose clothing or jewelry that could get caught in equipment must be removed, restrained, or secured.
7. Covered shoes must be worn at all times in the laboratory (e.g., no sandals, Crocs, or flip-flops).
8. No children, guests, or other students are allowed without the specific approval of the instructor.
9. Students may not sit on laboratory tables.
10. Electrical cords and equipment must be handled with dry hands and should never come into contact with liquids. Electrical equipment must be unplugged by pulling on the plug, not the cord.
11. Caution should be used when working with hot plates. The heating surface appears the same whether cool or hot, so the student should always assume that the surface is hot. It is essential to maintain cords away from the heating surface. If hot plates are still hot at the end of the laboratory period, they should not be returned to the storage area; this can be done later, once they have cooled.
12. Personal Protective Equipment such as gloves, glasses, UV-resistant eyewear or goggles must be worn as required by the instructor for specific experiments and activities.
13. Benches and other work surfaces must be immediately cleaned upon completion of work.
14. All wastes must be disposed of in accordance with approved and designated methods.
15. Emergency equipment shall not be obstructed at any time and must only be used as intended. This includes emergency showers, eyewashes, fire extinguishers, emergency shut-off valves, and fire blankets.
16. In the case of an alarm requiring evacuation, equipment must be shut off, and everyone must exit the laboratory in accordance with the evacuation maps posted at the exits. No re-entry is allowed until the emergency event is declared to be resolved. Students must meet with the instructor at the designated meeting area outside, as the instructor must call roll to ensure that all students have evacuated.
17. When experiments involve any source of energy such as steam, electricity, radiological sources, etc., students must remain present with the experiment at all times, and adhere to the specific requirements defined by the instructor.
18. Any work done outside of the assigned laboratory times must be approved by the instructor.
19. The student may not deviate from procedures or attempt unauthorized experiments.
20. The laboratory is a place of composed, directed scientific inquiry. Individuals should conduct themselves quietly; avoid crowding and haste; and maintain an environment free of clutter, distraction, and disruptions. The work area should be kept clean with all items returned to their designated locations when not in use.
21. Instructions for the use of specialized equipment must be carefully followed, and the student should ask for help when necessary. Solutions, tubes, slides, drawings, etc. must be properly labeled.
22. Equipment in use must be turned off any time that the student leaves the laboratory, including at the end of the period. Before leaving, each student should verify that nearby water faucets and gas outlets have been turned off.

23. If a computer is used during the laboratory activities, no information may be stored on the device. At the end of the period, the computer must be turned off, returned to its proper location on the cart, and plugged 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 laboratory activities.

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Signature)

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(Date)