

Safety & Right-to-Know Training for Students - 2012

Section I: Policies

Every student taking a lab course must receive **safety and Right-to-Know training**. The department training presented here will be provided by your TA each semester in both verbal and written form.

EHS, the University of Delaware Department of Environmental Health and Safety, also provides the **Hazardous Material Safety Manual**. Everyone should review this manual at <http://www.udel.edu/ehs/hazmatman.pdf>. It is an essential part of your required training. Printed copies are available from EHS if you are unable to access the online version.

Particularly study the following topics in the on-line manual:

- Understanding Material Safety Data Sheets (MSDS)
- Waste disposal
- Interpreting labels and how to properly handle chemicals
- Chemical hygiene procedures
- Personal protective equipment
- Types of hazards and routes of entry of toxins
- Acute and chronic effects of hazardous materials

Please note that EHS department is a comprehensive resource for safety information and assistance and can be contacted directly at 302-831-8475 or at <http://www.udel.edu/ehs>.

The U.S. Occupational Safety and Health Administration also requires that you are made aware of the University Chemical Hygiene Plan. It can be found at <http://udel.edu/ehs/chemhygieneplan.pdf>. The Chemical Hygiene Plan is the University's Laboratory Safety Manual. It contains complete information on how to work safely in the laboratory. Please take time to read through this manual.

Safety is everyone's concern and safety begins before you come to lab. Students should prepare by reviewing all aspects of the experimental procedure. This will enable you to work safely and efficiently, and possibly even finish sooner. If you have any questions about the experiment, contact your TA or professor ahead of time. If you have a safety concern, you have a right to file a complaint regarding safety matters and you are protected from retaliation for doing so. Violations of this policy may be reported to your professor, to CHEM Department offices or EHS.

Your TA will also provide safety information specific to each experiment, including information regarding chemical hazards, waste disposal, and how to use equipment properly, so it is important that you arrive on time. When setting up equipment, make sure **your TA has inspected and approved your set-up** before you begin to work. Make sure that proper techniques and procedures have been explained and demonstrated. Always follow all procedures as exactly as directed. Experiments are designed to be safe, but don't underestimate the danger of not following specific instructions.

Both students as well as TAs have responsibility for reducing hazards and preventing exposure to hazardous materials. Your TA is present to help you learn in a safe manner and is required to maintain discipline and **strictly enforce rules** pertaining to safety and behavior. And finally, if there are any **personal factors** that may affect you working in lab at any time, immediately notify your professor, TA, or EHS. An example would be situations related to **reproductive health, pregnancy or personal health questions** since certain chemicals may be of specific concern. Any time you have a question about safety, do not hesitate to ask!

II: Material Safety Data Sheets

Anyone who works with hazardous chemicals has a right to information regarding the hazards of chemicals according to state of Delaware *Hazardous Chemical Information Act of 1984*. This information is found in the **Material Safety Data Sheets** or **MSDS** which are located in notebooks in lab, on request, or through links at www.udel.edu/ehs. Students are expected to obtain and review the MSDS for each chemical used and understand the associated hazards and safe work procedures. A list of hazardous materials used in the lab will be listed in the lab procedure or will be available from your instructor. The

University also subscribes to the following sites available through the UD system:

<http://udel.chemwatchna.com/>
<http://ccinfoweb.ccoh.ca/msds/search.html>

A Material Safety Data Sheet (MSDS) provides basic information on a material or chemical product. It contains information on the properties and potential hazards of the material, how to use it safely, and what to do if there is an emergency.

The MSDS is an essential starting point for the development of a complete health and safety program for the material. However, MSDS are not complete sources of information on their own. They tend to be general in nature, since they provide summarized information which tries to address all reasonably anticipated uses of the material. Do not assume everything you need to know is contained on the MSDS.

Material Safety Data Sheets (MSDSs) contain hazard and safe handling information for hazardous materials. Students should consult MSDS resources for every chemical they plan to use before they start the experiment or procedure. MSDS contain information that identify the chemical, including:

- Chemical names and synonyms.
- Physical properties (appearance, odor, boiling point, etc.)
- Recommended Proper Personal Protective Equipment.
- Spill response information.
- Health and Physical Hazards
- Acute and chronic exposure symptoms.
- Incompatibility information and storage recommendations and requirements

III: Labeling

Proper labeling of chemical containers is an important aspect of safety and is required by law. Hazard information may never be withheld and you are not required to work with chemicals in unlabeled containers. Do not use any chemical that is not in a properly labeled container. **All containers must be labeled regardless of container size or quantity of contents.** Unlabeled or improperly labeled containers pose unnecessary health and physical risks to those who use or handle them and to emergency personnel. Disposal of chemicals in these containers is also difficult and expensive.

Container labels are the primary source of information for accurately identifying chemical contents and associated hazards, and they may also provide guidance for proper storage and for use of personal protective equipment. If the label is damaged or if the information is unclear, the label should be replaced immediately.

The label may be the manufacturer's label or may be printed from the ChemWatch at <http://udel.chemwatchna.com/>.

Labels include the following:

- common chemical name (no abbreviations, structures, or formulas)
- manufacturer's name
- chemical concentration and purity

Container labels contain information about physical and health hazards associated with chemicals contents. Read this information carefully. This information may come in the form of a NFPA hazard diamond, which conveys hazard information from the MSDS.

Whenever you finish working in lab, you are personally responsible to make sure you do not leave any unlabeled containers with chemicals in them. Before you leave, you should inspect all work areas for containers including sinks, balance tables, ovens, fume hoods, and student drawers. All containers, even ones containing only non-hazardous materials such as water, must be labeled with 1) the common chemical name or with IUPAC nomenclature 2) the date and 3) your name with course and section number. If you are labeling a mixture, list all contents with percent concentration, and remember that a mixture can pose a greater hazard than individual components by themselves.

Chemicals are handled differently in student labs where 'unknowns' are used in various ways for the purpose of learning techniques of identification and analysis. In these labs, the name and/or the concentrations of the chemicals may be withheld, but the hazard information may not. The TA will have all the required hazard information. Finally, if you have any questions about chemical labeling, ask your TA or contact EHS at 831-8475.

IV: Personal protective equipment

Personal protective equipment is essential in preventing hazard exposure. You are required to have your own approved **chemical splash goggles** which meet the current requirements of ANSI Z87.1 and CSA Z94.3. These are the only goggles approved by the University of Delaware for use in teaching labs. They are available for purchase at the bookstore and elsewhere, but note that workshop goggles, safety glasses, and other non-approved eye-ware are not acceptable. Safety glasses with side protection are NOT adequate!



The goggles must be worn properly at **all** times whenever a chemical or eye hazard is present. For reasons of fairness and personal hygiene, the department cannot loan goggles. There must be **no exceptions** to everyone in the lab wearing goggles when any hazard is present. This begins when anyone in the lab starts gathering equipment or chemicals. **The ONLY TIME that it is acceptable to not wear personal protective equipment in the teaching laboratory is during a pre-lab quiz in which there are no hazards present.** It is the responsibility of the TA to insure that no labwork begins until all students have finished the quiz and put on their personal protective equipment.

Gloves are always available and recommended, and are required when working with any hazardous materials. However, gloves are not impervious and should be quickly replaced if contaminated, and then disposed of in solid hazardous waste. Remember to always wash your hands with soap and water when you change gloves or leave the laboratory. Ask your TA for specific information on glove use.

Appropriate clothing is also required. Skin should be covered from the neck down except for short sleeves. Exposed skin around the waist is particularly dangerous because corrosive chemicals may splash or spill on the bench-top. **Open shoes and sandals are not allowed.** Shorts and 'clam diggers' are not allowed. Dresses and skirts may be worn, but they should be long enough so that there is no exposed skin. If you have long hair, it should be tied back.



It is also important to practice **good hygiene**. Never touch your face, mouth, or eyes with your hands or with anything that may have contacted hazardous materials, a pen for example. Do not eat, drink, chew gum, apply lipstick, lip balm or make-up in lab and always wash hands thoroughly after lab. To prevent contamination, backpacks and other personal items should be stored in the designated areas.

V: Waste Disposal

All **chemical waste**, including anything contaminated with chemical residue, must be disposed of in a properly labeled waste container. Proper disposal is required by law for safety reasons and to protect the environment. Never put anything down the drain unless specifically directed and never hesitate to ask your TA if you have any doubt about proper disposal procedures.

Liquid waste containers must be placed in a proper **secondary container** such as a tub or tray. To prevent dangerous interactions, only compatible materials may be placed in a waste container or in the same secondary container. Also avoid putting any solid items such as gloves, towels, or stir bars into liquid waste, and never put any liquid in the solid waste. **Proper labeling** of all waste is mandatory and specific orange labels are provided for this.

Items such as contaminated filter papers, gloves, and paper towels must be placed in properly labeled **solid hazardous waste containers**. This may be a bucket or a cardboard glass box, depending on the nature of the hazard and compatibility with other wastes. Regular trash cans are **only** for disposal of materials that have no chemical residue. Nothing that even resembles a chemical (e.g. table salt) should be placed in a regular trash can.

Broken glass, pipets, pipet tips, and other **sharp items** must be placed in the designated glass box or in a 'sharps' container - not in the trash can because they can cause injury by injecting chemicals into the skin.

When finished working in lab, return all materials to proper locations make sure that all containers, reagent containers as well as **waste containers, are closed and tightly capped**. It is your responsibility to clean your glassware and also to clean all work areas such as sinks, balance tables, and benches.

VI: Accidents and Emergencies

If there is an **accident or emergency**, your TA is trained to respond, but you should know the general procedures. Know the location of eyewash stations, safety showers, and know your evacuation route and assembly point. Remember that your assembly point is located at the steps of Colburn Lab (if you are in Drake Hall) or across the green in front of Mitchell Hall (if you are in Brown Lab).

Accidents, injuries, and exposures should be promptly reported to your TA who can report it by using a red phone, a blue-light emergency phone, a yellow emergency intercom, or by dialing 911 on a University phone. Transportation for treatment can be arranged through Public Safety, via ambulance, police, or security, depending on the need of the injured. Injuries or hazardous chemical exposures involving full-time students may be treated at the Student Health Center. Other students will be taken to an alternate appropriate facility and these students should therefore be aware of their student status, insurance, and personal choice of treatment.

For specific instructions regarding exposure of chemicals to the skin or eyes, inhalation or ingestion of a hazardous substance, or for burning clothing, refer to the sheet posted in your lab. **(TA must show location to all students)**

An ACCIDENT/INJURY REPORT must be completed for all accidents. Even if the accident is clearly minor and the student refuses treatment, the TA is still required to immediately complete the report that the student must sign certifying that he or she has chosen to not seek treatment.

To prevent accidents when working in lab, **work efficiently, but carefully** and don't rush. Many accidents are caused by not paying attention, spilling materials, grabbing broken glassware, touching hot dishes and other hot surfaces, and so forth. Think about what you are doing and be conscious of safety at all times.