SAFETY IN CHEMISTRY DEPARTMENT LABORATORIES

A top priority of the Department of Chemistry at Kenyon College is for students, faculty and staff to practice chemistry *safely*.

These guidelines for safe practice in chemistry laboratories are intended as the basis for more detailed instructions associated with specific chemical laboratory facilities and disseminated by those directly responsible.

Participation in chemistry lab work requires understanding:

- proper use of chemical reagents and glassware,
- stability, reactivity, flammability and toxicity of common chemicals,
- how to find safety information on chemical reagents,
- how to respond to an accident in a lab.

The basis of safety in the chemistry lab depends on:

- the **desire** to protect yourself and your lab-mates from potential hazards,
- **preparation** and **planning** for your laboratory work by being familiar with chemical and instrumental hazards *before* beginning an experiment.
- **using protective equipment** – goggles, gloves, lab coats, etc.
- **anticipating potential hazards** by asking "what would happen if...?",
- **minimizing exposure** to chemicals,
- knowing how to **get help** in case of an accident,
- knowing how to properly **dispose of any waste** you generate.

Teaching labs. Laboratory courses in the department provide opportunities to learn about safety in setting of structured activity and direct oversight. Each person working in a laboratory is responsible for the safety of *everyone* present. Safety information related to specific experiments can be obtained in lab manuals and pre-lab lectures. Before coming into a laboratory, read the experimental procedure and then listen carefully for verbal safety directions during class. If you are late for lab class and miss announced safety information, you may be unable to participate. Quizzes and exams in Chemistry Department courses may ask questions about safety practices and policy.

Research labs. Safety can be an even more important issue when working in research labs, as you may encounter more caustic chemicals and more potentially hazardous equipment. Also, students may have less direct guidance when working in a research lab. Work closely with your research mentor to discuss safe practices in your research lab and specific issues related to chemical reactions or experimental procedures that are new to you. Research course grades may reflect your demonstrated commitment to lab safety.

A chemistry laboratory safety agreement is included at the end of this safety section. You must read the safety information and sign the agreement before beginning *any* laboratory class in the department.

SAFETY RULES FOR THE CHEMISTRY LABORATORY

The 15 safety rules of our Department are outlined here and will be strictly and impartially enforced, and willful non-compliance will result in dismissal or suspension from the laboratory.

1. Wear splash-proof goggles at all times. We must guard against the possibility of eye injury or blindness in the event that chemicals come in contact with your eye. To minimize the risk of injury to your eyes, safety goggles must be work at all times in all chemistry labs (unless specifically exempted by the instructor). Goggles must be worn properly over your eyes, not around your neck or forehead. You may wear eyeglasses or contact lenses* underneath goggles. Even if you are not working with any chemicals, those around you may pose a potential eye hazard. Laboratory instructors will enforce the rules for the use of safety goggles in each laboratory. Failure to wear goggles may result in your expulsion from the laboratory without option to make up the missed work.

* "contact lenses do not pose additional hazards to the wearer and additional regulation is unnecessary." – O.S.H.A. "contact lenses can be worn in most work environments" – A.C.S.

2. Wear clothing suitable for laboratory work. Shoes must completely cover the feet to protect them in case of a spill - no sandals or open-toed shoes. Legs must be covered by long pants or a lab apron. Clothes may become damaged from spills or stains, so you may wish to wear a laboratory coat or apron. Tie back very long hair or very loose clothing. You will be asked to return to your room to change if you come to lab dressed inappropriately.

Gloves may be required for certain experiments and are always available. Inform the instructor of any known latex allergy. Do not wear gloves when using computers, doorknobs or leaving the lab.

3. Keep food, drink and chewing gum out of laboratories. Avoid having your mouth contact any objects - even seemingly clean ones - in the laboratory. Keep pipettes, bottles, and even your hands away from your mouth. This rule also applies to student desks inside research labs.

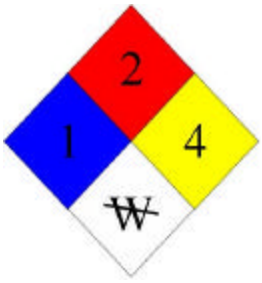
4. Keep the laboratory benches and floors clean and clear. Keep coats, backpacks, books, and other items unnecessary for laboratory work outside of your work area. Store reagent bottles, glassware, and small equipment in proper drawers, not on bench tops. Never place reagents or equipment on the floor.

5. Work with a lab supervisor or lab partner. Working alone in a laboratory can be dangerous in the event of an emergency. Faculty, staff and student teaching assistants directly supervise introductory lab classes, while advanced lab classes and research opportunities may involve more independence. If you are alone in a laboratory during the day or early evening, make sure that someone in the building knows you are working and what you are doing, and keep the door to your lab open. Do not perform any potentially hazardous procedures without direct faculty supervision.

6. Stick to the planned experiment. In teaching labs, consult your laboratory instructor before attempting any procedure not specified in the lab manual. In research labs you often need to think on your feet, but if you are considering heading into a new type of experiment or deviating from a planned procedure, consider when you may need to stop and consult your research mentor to assess your plans.

7. Carefully read labels on bottles and containers before using reagents. In teaching labs, be certain you are taking reagents from the correct bottle. In research labs, check labels for symbols indicating flammability, reactivity, health concerns, and other potential hazards associated with the reagent. Also, be aware of the date on reagents bottles (and place the date on new bottles you use), as some regents will decompose and may pose dangers if used.

Numbers are often used to rate potential hazards on a scale from 0 (least hazardous) to 4 (most hazardous). For example, the National Fire Protection Association (NFPA) "diamond" label indicates flammability (top/red), reactivity (right/yellow), health hazard (left/blue) and other special hazard (bottom./white) for a reagent.



8. Check glassware and equipment before using. Chipped or cracked glassware should be discarded. Tell your laboratory instructor about any electrical equipment that is not working properly or has frayed wires.

9. Be cautious of chemical odors. Even quick whiffs of some volatile reagents can be noxious or toxic. Chemicals primarily enter the body through the respiratory system. Use fume hoods when necessary, such as when working with toxic or volatile reagents. Do not put your nose directly over a sample. Instead, gently *waft* the vapors towards your nose. Be aware that some toxic substances are odorless.

10. Be cautious of hot objects and sharp objects in the lab. Hot plates and heating mantles often do not look hot, but may cause serious burns if touched. Also, reaction glassware may become hot due to chemical reactions, so place reaction flasks on cork rings or clamp to a ringstand. Watch for cracked glass, needles and sharp metal objects.

11. Clean up spills immediately. Inform other working near you if you spill a reagent. For small spills, seek to contain the spill, then consult an instructor on how to dispose of the waste. Neutralize strong acids or base spills. <u>For large spills – leave the room and notify an instructor immediately.</u>

12. Properly dispose of waste and sharps. Never pour chemical waste down the sinks or into the garbage can unless specifically instructed to do so. When possible, keep different types of waste separated. Waste jars for specific reagents are available in the teaching labs. Properly label waste bottles in research labs. Keep waste jars capped. <u>Never overfill a waste jar</u>.

All sharp glass and metal must be placed in the sharps waste containers. All syringe needles must be placed in the biohazard (even when they are not, they look like it)

containers. Failure to place sharps and needles in the correct waste containers places our maintenance staff at risk of injury.

13. Know the locations and operations of all safety emergency equipment in the laboratory. Your laboratory instructor will demonstrate the location and use this safety equipment:

- ***emergency alarm and telephone***: Kenyon emergency is **X 5555**. Building alarms do not automatically notify Kenyon security office: **PULL *and* CALL**.
- ***first-aid kit***: located in each lab near a Red Cross logo.
- ***eyewash stations***: keep your goggles ON until you have completely rinsed your face of chemicals.
- ***fire extinguishers***: located in all of the hallways of Tomsich Hall.
- ***safety showers***: look for tape on floor, and be advised that there is no floor drain.
- ***fire blanket***.
- ***Material Safety Data Sheet (MSDS).*** MSDS Sheets are available for all reagents you work with in this lab course. Know their location.

14. Know what to do in case of an accident or emergency. Immediately report to your laboratory instructor any accidents, no matter how minor. Some cuts, burns or chemical contacts only become problematic after you leave the lab. In such cases, *we need to know* about the exposure in the event that you need assistance from a medical professional after class is over.

If a reagent spills on you, remove affected clothes or gloves (bathrooms are nearby) and use shower or wash station, as needed. Assist others who may spill a reagent.

If you are cut, quickly and thoroughly wash the wound with water and bandage before continuing any lab work.

In case of fire: YELL, stop/drop/roll. Use fire shower or fire blanket and get a fire extinguisher from the hallway. In the event of a building fire or alarm, exit Tomsich Hall and meet in front of Rosse Hall.

15. Clean up before leaving the laboratory. Clean up equipment you used, wash glassware, and rinse the bench or hood surface you work on. Return reagents to their proper place and label containers of all prepared compounds. Before leaving the lab, REMOVE YOUR GLOVES and wash your hands thoroughly with soap.

CHEMISTRY DEPARTMENT SAFETY AGREEMENT SHEET

You must read the safety information above, sign the safety sheet and submit it to your instructor before beginning the first experiment.

When working in a chemistry laboratory, I agree to:

1. **wear splash-proof goggles at all times**
2. **wear clothing suitable for laboratory work**
3. **keep food, drink and chewing gum out of laboratories**
4. **keep the laboratory benches and floors clean and clear**
5. **work with a lab supervisor or lab partner**
6. **stick to the planned experiment**
7. **carefully read labels on bottles and containers before using reagents**
8. **check glassware and equipment before using**
9. **be cautious of chemical odors**
10. **be cautious of hot objects and sharp objects in the lab**
11. **clean up spills immediately**
12. **properly dispose of waste and sharps**
13. **know the locations and operations of all safety emergency equipment in the laboratory**
14. **know what to do in case of an accident or emergency**
15. **clean up before leaving the laboratory.**

I understand that failure to follow these safety rules may limit my ability to participate in laboratory courses or research, even if that results in a lower course grade. I recognize that I am responsible for my own safety *and* the safety of those working around me in the laboratory.

_____ _____

student signature student name (print)

_____ _____

course date