Reed College Physics Safety Manual

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1.0 Purpose and Scope

This manual serves as a resource document for the department of Physics in compliance with Reed College Environmental Health and Safety and various state and federal organizations (Environmental, Occupational Health, and Safety).

Laboratories must develop written manuals which include specialized safety procedures, respective to discipline, for all facets of laboratory activity.

This manual provides general guidelines and basic rules within the physics department to:

- Encourage awareness of the risks in doing laboratory procedures
- Promote safe and best practices in the laboratory
- Protect the wellness and health of students, instructors, and laboratory personnel

2.0 Instructor Compliance and Enforcement

- It is the responsibility of the instructor to ensure the safety of each person working or volunteering in the laboratory.
- Instructors must know the laboratory safety guidelines and procedures applicable to the Physics Department.
- Instructors must abide by all safety policies and procedures particular to their discipline.
- At the start of each semester, instructors must provide and review the safety policies associated with their particular laboratory.
    - Provide demonstration/explanation about the location and use of safety equipment and proper use of laboratory items.
    - Review emergency procedures related to a fire emergency, earthquake, accidents/injuries, etc.
- Instructors will ensure compliance with the approved safety policies with all students, volunteers or other people who enter their laboratory.
- Instructors will document and report any lab-related incident to the laboratory personnel, EHS, or the department chair.
- The Physics Department Chair will be responsible for addressing any situation involving non-compliant students, staff, or faculty.
- The Physics Department Chair will be responsible for enforcing consequences in cases of non-compliance in relation to the approved safety policies.

3.0 Personal Protection Requirements

- To protect yourself from possible injury, wear safety goggles when instructed. Contact lenses may be worn in combination with eye protection (goggles).
- Tie back long hair when working with hazardous materials or other lab equipment.

- Remove or tie back any loose articles of clothing or jewelry including scarves & bulky shirts or jackets.
- Gloves are required whenever there is the potential for contact with hazardous materials, and should never be reused. Do not attempt to wash disposable gloves. Change them when they are dirty, contaminated or ripped. Dispose of properly.
- Shoes must have closed toes and closed backs. Do not wear sandals or open toed shoes in the laboratory.

4.0 First Aid

- Report all accidents, spills or broken glassware & equipment, no matter how minor, to your instructor immediately.
- Know location of safety equipment & proper use. Complete and submit appropriate incident report form for each incident that occurs during lab time.

5.0 General Rules and Standard Laboratory Practices

- Never enter the laboratory without the presence of the laboratory instructor, laboratory staff, or other laboratory personnel who have attended safety training.
- Conduct yourself in a responsible manner at all times in the laboratory. Never leave your lab activity unattended.
- Be sure you understand all procedures in any lab investigation and possible hazards associated with it.
- Read ALL directions for an investigation several times, and follow directions EXACTLY as they are written. Ask questions if you are not sure how to proceed.
- Never perform unauthorized experiments.
- Never handle equipment unless you have specific permission.
- If accidents/injuries/spills occur, notify your instructor immediately.
- No eating, drinking, smoking, applying make-up in the lab. Food and drink is to be left outside the lab. This includes capped bottled water and soft drinks.
- Notify your instructor of any medical conditions you may have, such as pregnancy, allergies, asthma, or epilepsy. It is recommended that you discuss your condition with your family physician for guidance and monitoring.
- All operations in which noxious or poisonous gases are used or produced must be carried out in a fume hood.
- Broken glassware should be swept up with a broom and dust pan and placed in the “Broken Glass Box.” Never place broken glass in the regular garbage can.
- Water should not be used or present near electrical sources such as computers and equipment. Use caution when working around electricity.
- Laboratory prep area is for laboratory instructor use only. Do not enter unless authorized to do so.
- Do not place fingers within rotating fans or dynamic carts.

- Be sure to clean your area thoroughly 5-10 minutes before the end of the class and keep the lab space clean for the next class period. Wipe down the counters, put away all equipment in clean, cool & dry condition. Wash your hands before leaving the lab area.
- The location of exits, safety showers, eye wash, fire extinguishers and the nearest telephone (emergency) should be ascertained before beginning work.

6.0 Laser Safety

- All laser users should be trained before using it.
- Access to lasers should be limited to non-laser users. Keep the door closed.
- An active laser should never be left unattended unless it is a part of a controlled environment.
- The illumination in the area should be as bright as practical, so that the pupils of the user's eye will be constricted.
- The laser should be set up so that the beam path is not at normal eye level.
- If possible, cover the laser system with PVC to prevent accidental exposure.
- Remove or cover any shiny object to prevent reflection.
- Windows in the laser area should be covered.
- Use audible or visual warning devices to monitor any presence of wavelengths outside the visible spectrum.
- The laser beams should be ended or stopped properly by using a beam block (required for any laser that may exceed the maximum permissible exposure).

More information regarding Laser Safety can be found in the Laser Safety Manual.

7.0 Chemical Safety

- Chemicals must be mixed only following the experimental procedure and only when the instructor is present.
- Never touch, taste, or smell a chemical unless instructed to do so by your instructor.
- Keep your hands away from your face when working with chemicals.
- If fumes are potentially dangerous, conduct procedure in a well-ventilated fume hood.
- Notify your instructor IMMEDIATELY if chemicals are spilled.
- Dispose of all chemicals as directed by your instructor.
- Always use the pipettes provided with reagent bottles to avoid contamination of reagents.
- Use extra caution when working with acids or bases.
- When diluting acids, ALWAYS pour acid into water to dissipate the heat produced. NEVER pour water into a concentrated acid.
- Become familiar with safety precautions for each chemical to be used in an experiment. Know where eyewash stations and fire safety equipment are located, as well as proper use.

- Always label your chemicals with full chemical name, hazard class, and contact information.
- Store waste properly with a closed lid and in a fully labeled container.

8.0 Using Glassware

- Never force glass tubing into a rubber stopper. Use a lubricant such as glycerin to make the glass slide in easier.
- Test glassware to be sure it is not hot before picking it up.
- Never use broken or chipped glassware. If glassware breaks, notify your instructor and dispose of the glassware in the proper broken glass container.
- Never eat or drink from laboratory glassware. Do not eat or drink in the laboratory.
- Clean glassware thoroughly before putting it away, and wet glassware should be put into the strainers to dry.

9.0 Using Sharp Instruments

- Never cut material toward you; cut away from you.
- Notify your instructor immediately if you cut yourself or receive a cut.

10.0 Evacuation and Emergency Situations*

- Familiarize yourself with the evacuation routes and the nearest exits.
- When the building alarm sounds, all must evacuate via the nearest designated emergency exit and proceed to the designated assembly areas.
- Follow directions given to you by your instructor, supervisor, manager, and/or emergency officer.
- During emergency power shut down, the power sources should be shut off (heaters, agitation equipment, motor, vacuum pumps, UV lamps, and any electrical equipment). Do not work with chemicals or equipment under emergency lighting.
- In case of a fire, immediately evacuate the building through the nearest exit route. Do not use elevators. Assist mobility-impaired persons in exiting the building.

*See Reed College Emergency Policies and Procedure at https://www.reed.edu/ehs/emergency_procedures/index.html

11.0 Hazard Communication

11.1 GHS Pictograms and Hazard Classes

Flame Over Circle  • Oxidizers	**Flame**  • Flammables • Self Reactives • Pyrophorics • Self-Heating • Emits Flammable Gas • Organic Peroxides	**Exploding Bomb**  • Explosives • Self Reactives • Organic Peroxides
Skull and Crossbones  • Acute toxicity (severe)	**Corrosion**  • Corrosive to Metal • Skin Corrosion • Serious Eye Damage	**Gas Cylinder**  • Gases Under Pressure • Liquefied Gas
Health 	**Environment** 	**Exclamation Mark** 

• **Carcinogen** • **Respiratory Sensitizer** • **Reproductive Toxicity** • **Target Organ Toxicity** • **Germ Cell Mutagen** • **Aspiration Toxicity**	• **Environmental Toxicity**	• **Skin Irritant** • **Dermal Sensitizer** • **Acute Toxicity (harmful)** • **Narcotic Effects** • **Respiratory Irritation** • **Eye Irritation**

11.2 Radioactive Material Symbol

All laboratory entryways and storage areas working with radioactive materials must be labeled with the radioactive material use sign below. Warning labels shall be affixed to containers of waste, refrigerators, freezers, incubators, and centrifuges containing radioactive materials.

Physics Laboratory Student Agreement

All students registered for a physics lab section are responsible for reading, reviewing and signing the safety policies each semester. The rules are designed to give you and fellow students a safe and educational lab experience. Most accidents or injuries can be prevented by using common sense and following the policies listed below. Violation of the agreement could result in removal from the lab.

Laboratory Policies:

1. Proper apparel must be worn by all students in the laboratory. No open-toed shoes will be tolerated. If students come to lab wearing inappropriate apparel, they will be asked to cover the exposed area or leave.
2. Splash resistant, indirect vent goggles will be supplied to ALL laboratories and worn when instructed.
3. Food, drinks, candy, and gum must not enter the laboratory. Food and drink is to be left outside or in a backpack while in the lab. This includes capped bottled water and soft drinks.
4. Please report any accidents/injuries/spills immediately to your instructor. The instructor will determine the best way to address the problem.
5. Students must familiarize themselves with the safety equipment in the laboratory, including fire extinguishers, eyewashes, safety showers, spill kits, and fire exits.
6. Broken glassware should be swept up with a broom and dust pan and placed in the "Broken Glass Box." Never place broken glass in the regular garbage can.
7. Chemicals must be mixed only following the experimental procedure and not arbitrarily.
8. Do not remove chemicals from the laboratory.
9. Never leave lab experiments unattended.
10. Cell phones should not be used in the laboratory without the permission of your instructor or lab supervisor.
11. Avoid contamination of reagents. Always use the pipettes provided with reagent bottles.
12. When using strong acids, bases, or organic solvents, gloves must be worn. If asked to note an odor, gently waft the vapors to observe the smell.
13. When using biological agents/microorganisms in the lab, perform proper handwashing (soap and water) before and after each laboratory exercise, observe aseptic techniques, and disinfect bench before and after the laboratory session with 70% alcohol solution.
14. Gloves are required whenever there is potential for contact with hazardous chemicals and should never be reused.
15. Deliberate misuse of instruments or disturbing behavior may result in disciplinary action.
16. Chemicals must be disposed of in the appropriate waste container and must never be put down the drain without the approval of the instructor. The instructor will direct students concerning proper waste disposal.
17. All containers must be labeled with contents and contact information.
18. All heating sources must be turned off and unplugged at the end of each lab period. (i.e. hotplates, Bunsen burners, and bead baths).
19. Student's hands, the lab bench and any equipment should be washed or wiped down at the end of each lab period. This includes hot plates, balances, and any other equipment used. The lab space must be clean and ready for the next class period.

20. Follow any other safety rules given in the lab protocols or issued by your laboratory instructor.
21. When building alarm sounds all must evacuate via the nearest designated emergency exit and proceed to the designated assembly area.
22. In case of a fire, immediately evacuate the building through the nearest exit route. Do not use elevators. Assist mobility-impaired persons in exiting the building.

Student Agreement:

I have read and agree to follow the Physics Lab Student Agreement. I am aware that the instructor and /or laboratory staff has the right to report on or remove me from the laboratory if I fail to adhere to these policies. Furthermore, I understand that my instructor may deduct points for failure to obey these laboratory policies

Print Name:_____

Signature:_____ Date:_____

_____I wear contact lenses.