Biology Lab Safety

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Objectives in the Lab

- Work safely with biological materials, equipment, and chemicals.
- Understand the role of microorganisms and biological agents in lab settings.
- Recognize safety levels and procedures for handling different organisms.
- Develop habits that protect yourself, your classmates, and the community.

Occasionally, a student may need to enter the laboratory outside of scheduled class time to check an experiment, collect data, or complete a minor task. Because laboratory work involves potential risks, the following policies apply:

- Permission Required

Students must receive prior approval from the instructor before entering the lab alone.

- Authorized Tasks Only

Students may only perform the specific task(s) approved by the instructor. Examples of permitted low-risk tasks:

- Checking microbial growth on plates (observation only)
- Recording instrument readings or weights
- Collecting data from experiments already in progress
- Watering plants or maintaining specimens

- No Hazardous Work

Procedures involving flames, volatile chemicals, electrical equipment, sharps, or live microbial cultures are **not permitted** when working alone.

- Time & Sign-In

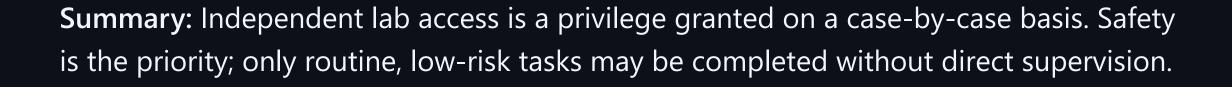
Students must complete lab tasks during building hours and sign in/out as directed.

- Accountability

Students are responsible for leaving the lab secure, with all equipment cleaned, powered down, and returned to its proper place.

- Emergency Protocol

In case of accident or injury, students must immediately contact campus security (or dial 911 if needed) and notify the instructor.



General Safety in the Lab

- Wear appropriate protective clothing:
 - Closed-toe shoes, no tank tops.
 - Lab coat, gloves, and safety glasses when appropriate.
- Tie back long hair.
- Do not handle cultures if you are sick.
- If you are pregnant or immunocompromised, notify the instructor.
- Always follow instructor guidance for equipment use.

Handling Specimens

- Treat all specimens (plant, animal, human, or microbial) as potentially hazardous.
- Wear gloves when handling preserved or fresh specimens.
- Dispose of tissues and dissected material in designated biohazard or specimen containers.
- Follow instructor directions for cleanup and disposal.

Open Flames & Heat Sources

- Bunsen burners, alcohol lamps, and hot plates can cause burns or fires.
- Keep flammable materials away from open flames.
- Tie back long hair and secure loose clothing.
- Always turn burners off when not in use.

Electrical Safety

- Equipment such as gel electrophoresis units, centrifuges, and microscopes use electricity.
- Keep cords and plugs dry; do not touch equipment with wet hands.
- Report frayed cords or malfunctioning equipment immediately.
- Disconnect power before adjusting equipment.

Field & Outdoor Safety

- When collecting samples outdoors (creeks, fields, woods):
 - Wear closed-toe shoes or boots.
 - Be alert for snakes, ticks, or other wildlife.
 - Use gloves when handling soil, plants, or water samples.
 - Bring water and practice sun protection as appropriate.
 - Follow instructions for safe sample collection and transport.

Emergency & Hazard Safety

- Dispose of broken glass in the designated sharps container.
- Know the location of safety equipment:
 - First aid kit
 - Emergency shower
 - Fire extinguisher
 - Eye wash station
- Report any accidents or spills immediately.

Best Practices

Please:

- No eating, drinking, or applying cosmetics in lab.
- Never mouth pipette.
- Do not chew pens or touch your face while working.
- Minimize exposure to all cultures and chemicals.
- Keep your work area organized and uncluttered.

Standard Lab Practices

- Wash hands before leaving lab (required in microbiology labs).
- Keep fingernails short (no artificial nails or tips).
- Do not use electronics while handling biological materials.
- Routinely disinfect work surfaces.
- Never remove cultures, chemicals, or specimens from the lab.

Waste & Decontamination

- Dispose of waste properly:
 - Liquid cultures → autoclave.
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- Disinfect bench tops with 70% ethanol (or approved cleaner) at the beginning and end of class.
- Keep tubes upright in racks.
- Cover spills with paper towels and notify the instructor immediately.

Biosafety Levels

- Labs are categorized by Biosafety Levels (BSL-1 to BSL-4).
- Risk levels are based on:
 - Infectivity
 - Disease severity
 - Transmission route
 - Nature of the work
- Most teaching labs use BSL-1 or BSL-2 organisms.

BSL-1

- Basic protection for well-characterized organisms.
- Not known to cause disease in healthy adults.
- Standard PPE (lab coat, gloves, eyewear) recommended.

BSL-2

- Moderate-risk organisms that may cause human disease.
- Transmission possible by ingestion, injury, or mucous membrane exposure.
- Restricted access during experiments.
- Aerosol/splash procedures conducted in a biosafety cabinet.
- Decontaminate equipment before removal.

Higher Containment (BSL-3 & 4)

- BSL-3: Agents spread by aerosols, can cause serious or lethal disease.
 - Requires special PPE and additional containment measures.
- BSL-4: Exotic, life-threatening agents with no available treatment.
 - Restricted to maximum containment labs with positive-pressure suits.

Note: Teaching labs will not involve BSL-3 or BSL-4 organisms.

References

1. U.S. Department of Health and Human Services.

Biosafety in Microbiological and Biomedical Laboratories (6th ed.). 2020.