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.

Lab Access Policy

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.

Lab Access Policy

- 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

Lab Access Policy

- 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.

Lab Access Policy

- **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.

Summary: Independent lab access is a privilege granted on a case-by-case basis. Safety is the priority; only routine, low-risk tasks may be completed without direct supervision.

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.
  - Agar plates & solid wastes → disinfect and place in biohazard container.
- 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.