# Biology Lab Safety Guidelines for Student & Supervising Adult

**Safety measures to follow *before* starting a lab.**

***Before* you begin *any* lab, *always* follow the preparation guidelines below.**

Preparing your work area

- **It is never safe to conduct labs alone! Always have a supervising adult nearby to monitor and respond to any emergencies that might arise.** Keep a supervising adult present during labs as some labs include substances that can be harmful (e.g., toxic, corrosive, irritants, flammable) or involve fragile equipment that could break (e.g., glassware). If a child or pet enters your work area, this supervising adult will need to remove them immediately.
- When you are conducting a lab, your full attention should be on following safety guidelines, following lab instructions, and being aware of your surroundings. Be alert, not distracted or tired. Ensure that distractions are minimized. Everyone can be distracted and this is extremely dangerous in a lab.
- Remove children and pets from your work area. Children and pets can distract you but also endanger themselves by touching/tasting/smelling/spilling chemicals, causing fires, or breaking fragile lab equipment such as glassware. This can happen in an instant and the consequences can be deadly. For your own safety and that of your household, ensure children and pets are removed from your work area.
- Your workspace should be clean and tidy. Clear the counter or tabletop of any other materials. Clear away any items that could be contaminated or ruined by an accidental spill.
- If using a burner or stove, be extra careful to remove ANY clutter from your work area and ensure your burner or stove is NOT near/under cabinetry or other household furniture that could catch fire.
- Remove all food and drink items from your work area. Any food-related items that are used in lab for testing or analysis are considered lab chemicals thereafter and should remain with lab stock. Do not return any chemicals used in the lab to kitchen or other food prep area (e.g., baking soda used for a lab should not be used for making cookies after). See chemical storage guidelines further below.
- To avoid the chance of electrical shock, ensure any electrical appliances are used away from sinks/taps and dry any spilled water or other liquid before plugging in these appliances. Do not use any electrical equipment with damaged/frayed/loose electrical cords. Completely dry your hands before touching electrical outlets, plugs, or switches.
- Keep flame sources, sparks, and heat away from flammable substances to avoid fires.
- Check glassware and equipment before using and do not use if damaged. Check that any glassware or other labware you are going to use is clean. In the clean-up section further below, I will describe how to clean glassware at the close of every lab so that it is clean for the next lab you do.
- In case of emergency, know where the nearest phone, fire extinguisher, and first aid kit are. Also know where the nearest shower and sink are in the case of a chemical spill to your skin or eyes.
- In addition to knowing emergency # (e.g., 911), make a list of other emergency numbers and contacts and post near your work area.

Preparing yourself

- Wear chemical-splash goggles, nitrile gloves, and lab apron.
- Wear close-toed shoes and long pants.
- Do not wear loose, baggy, or bulky clothing. Remove jewelry.
- Tie loose or long hair back.
- It is strongly recommended that you remove contact lenses (and wear prescription glasses as needed) because if you get any chemicals in your eyes, these chemicals could get “stuck” behind these lenses, making it difficult to wash your eyes out. Regardless of whether you do or don’t wear contact lenses, you will still need to wear goggles over your contact lenses or prescription glasses.
- Where provided, read chemical bottle labels for each chemical used before use.
- Read all lab instructions before starting the lab to know proper lab procedures, safety guidelines, and waste disposal. Keep these lab instructions where you can easily review them during the lab.

**Safety measures to follow *during* a lab.**

***During* a lab, make sure you are following the guidelines below.**

General Rules

- Make sure you have already followed the prior guidelines to prepare yourself (safety attire!) and your work area (safe work space!). **Again, it is never safe to conduct labs alone! Always have a supervising adult nearby to monitor and respond to any emergencies that might arise.** Keep a supervising adult present during labs as some labs include substances that can be harmful (e.g., toxic, corrosive, irritants, flammable) or involve fragile equipment that could break (e.g., glassware). If a child or pet enters your work area, this supervising adult will need to remove them immediately.
- Anyone near the lab should be dressed for the lab by wearing goggles, nitrile gloves, and lab apron.
- Remain alert, aware of your surroundings, and focused during labs. Avoid distractions, horseplay, or jokes at all costs. When you aren't alert and focused, you can easily have an accident leading to chemical spills, chemical contact with your eyes/skin, a fire, or other highly dangerous scenario.
- Follow the lab instructions carefully and do not deviate from these instructions or attempt to shorten them.
- Assume any chemical is potentially dangerous and handle it accordingly.
- Handle equipment gently and carefully. It is very easy to break glassware such as beakers, flasks, or test tubes or other fragile equipment such as a glass thermometer.
- Do not touch your eyes, mouth, nose, general face and body area with your gloves as they may have chemicals on them that could be hazardous. Avoid adjusting your goggles with chemical-contaminated gloves which can easily lead to chemicals in your eyes.
- Do not smell chemicals directly. If directed to smell a chemical, use your hand to waft the smell towards you.
- Do not use lab equipment as a food or drink receptacle. This is very dangerous as a beaker of acid looks exactly the same as a beaker of water.
- Do not taste any chemicals used or made in the lab to avoid poisoning.
- Do not eat, drink, or chew gum during the lab.

Heating substances

- Always have a clear area both around and above your work area when using a burner/stove and rest any portable burner/stove on a non-flammable surface (e.g., tile countertop). Be ***absolutely sure*** that your work area is clear of clutter and that your burner/stove is not near/underneath cabinetry or other house fixtures or furniture that could easily catch fire.
- If using a gas burner/stove, avoid gas leaks by always turning off the gas if the flame goes out and when you are finished with using burner/stove.
- Do not leave any lit burner/stove unattended.
- Point the open end of a test tube away from your face or that of others when heating.
- Do not put your face directly over a test tube, beaker, or other container being heated.
- Use test tube tongs to handle hot test tubes and use heat resistant hot mitts to handle larger hot glassware (e.g., beakers or flasks) or equipment.
- Allow hot items to cool down on trivet before handling – not on lab surface directly.
- Careful! Hot substances/equipment will appear the same as cool substances/equipment. Move your hand beside the item to detect if the item is still hot before handling.
- Do not transfer hot glassware directly to cold water as this can cause glass to shatter.
- A microwave should only be used if directions call for this. Only use dishes that are labeled microwave-safe by manufacturer (e.g., typically ceramic or glassware – not plastic or metal). Do not use lab glassware in microwave. Only heat materials that are food safe.

Avoiding Contamination

- Use a clean and dry spatula/scoop to take out any chemicals from a chemical stock bottle.
- Do not return unused chemicals to their stock bottle.
- Label chemicals and equipment used for labs as "LAB ONLY" so they do not get mixed up with kitchen supplies.
- Some labs will need to sit overnight. Be sure to place them in a safe place and label them so they do not get mixed up or accidentally thrown away.

Responding to Accidents

- Tell your supervising adult immediately if you have an accident which could include chemical contact with skin/eyes, spills, cuts, burns, or other incident.
- If you accidentally spill any chemicals, notify your supervising adult immediately.
    - For most chemicals, you can use paper towel to mop up. Then wash surface afterwards with soap and water. Dispose of paper towel in outside trash can. However, review lab instructions before cleaning up.
- If you accidentally get any chemicals in your eyes or notice any eye irritation, notify your supervising adult immediately, and immediately wash your eyes at the sink by splashing lukewarm water continuously for 20 minutes. Then, remove contact lenses if present and easy to remove. Continue rinsing. Seek medical and/or emergency attention as needed.
- If you accidentally get any chemicals on your skin or notice any skin irritation, notify your supervising adult immediately, remove any clothing items that may have chemicals on it, and begin rinsing the skin under tap water or in the shower for at least 20 minutes or until irritation subsides. Seek medical and/or emergency attention as needed.
- If you accidentally ingest any chemicals, notify your supervising adult immediately. Seek medical and/or emergency attention as needed.
- If you accidentally get burned, notify your supervising adult immediately and begin running cold water over the burn for several minutes or until burning sensation begins to subside. Seek medical and/or emergency attention as needed.
- In the case of broken glass, carefully use a broom and dust pan to sweep up larger glass pieces and then vacuum to ensure all glass pieces are gone. Do not pick up broken glass with your hands.
- If you do spill water or other liquid around electrical appliances, notify your supervising adult immediately to turn off these appliances and then dry the wet area before turning appliances back on.
- If a fire starts, notify your supervising adult immediately. Call 911 as needed.

**Safety measures to follow for disposal of chemicals and clean-up of work area.**

***After* a lab, make sure you are following the guidelines below.**

Disposal

- All waste can be treated as non-hazardous waste. However, since many of the labs use living or once-living materials, be mindful of the smells that could occur if materials are not promptly or correctly disposed of.
- Secure waste in bags and bins to keep curious animals (including pets) from getting into it.

Clean-up

- Put all chemicals away in their designated place. See next storage section for more instructions.
- Wash and dry all glassware thoroughly. Contaminated glassware can result in contaminated labs in the future. Wash them by hand in a bathroom sink to avoid contaminating food preparation surfaces. Do not place them in the dishwasher unless otherwise noted.
- Thoroughly wipe all counter areas down with soap and water.
- Use soap and water to thoroughly wash your hands when you are completely finished with the lab and clean-up

**Safety measures to follow for proper storage of chemicals.**

Most of the labs for this course are considered “kitchen chemistry” labs. This means that the lab components can be purchased at the grocery store and are food safe. However, like cooking, it is wise to approach labs with special attention because of the regular hazards involved. When storing chemicals, set aside labeled boxes or bins for lab-specific materials. Do not cross-contaminate materials.

Portions of this safety guidelines document were generally informed by: Swan, Christina H., and Mayes, John D. Chemistry Experiments for High School at Home. Austin, TX: Novare Science & Math, 2014.