First-year Chemistry Program
Lab Safety Guidelines

Hazard vs. Risk

- Hazard and risk aren't the same thing, and it's important to know the difference.

Hazard	Risk
Causes harm	The probability that a hazard will cause a hard
Can be eliminated but not reduced	Can be reduced

Hazard vs. Risk

- Crossing the street presents a hazard (getting hit by a car). Risk is the likelihood that you actually will be harmed crossing the street.
  - Risk is higher if you cross a busy street a rush hour than if you cross a deserted street at night.

Understanding the hazards in a lab helps you reduce risk.

https://www.chemicalsafetyfacts.org/chemistry-context/understanding-risk/?gclid=EAIaIQobChMI0cDmxqDB1QIVgzaBCh1znAY_EAAYASAAEgJCJfD_BwE

Food and Beverages

- No food or beverages are allowed in the lab space ***at any time.***
- Water bottles should be left outside the door of the lab.
- Any food items should remain in your bag at all times.

Source

Routes of Exposure

- Contact with reagents used in the lab pose risks in three ways:
  - Ingestion
    - Through the mouth--this is why food, gum, and beverages *never* are permitted in the laboratory.
  - Inhalation
    - Breathing (particles or vapor)
  - Injection
    - May be with any sharp object, not just needles
  - Absorption
    - Through the skin
    - Easy to prevent through proper use of ***personal protective equipment (PPE)***

Personal Protective Equipment (PPE)

- PPE requirements vary by laboratory setting. In the freshman chemistry program, required PPE includes:
  - Long pants (or long skirts with approval)
  - Closed toe shoes that cover the top of the foot
  - 100% cotton lab coat
  - Safety glasses or goggles
  - Gloves

Pants and Shoes

- There should be ***no*** skin showing below the waist (while you are standing) at any time you are in the laboratory space.

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Pants and Shoes

- Canvas shoes aren't a good choice for lab since they may not repel spills as well as other materials.

Pants and Shoes

- Leggings and tights do ***not*** count as pants in laboratory spaces.
  - Clothes that fit more loosely can be pulled away from the skin more easily if there is a spill.


Source


Source

Pants and Shoes

- What does “appropriate lab attire” look like?

Source

Open Flame Hazards

- Long hair that is not tied back and neck ties are potentially dangerous in the lab.
  - They increase risk in the presence of open flames.
  - Along with dangly necklaces, they hazards in the presence of machinery in which they may become entangled.
  - Loose or baggy clothing poses similar risk when lab coats are worn.

Lab Coats

- Lab coats must be:
  - Long sleeved
  - Mid-thigh length
  - *Buttoned when you are in the lab*
  - 100% cotton
    - Cotton is flame-retardant and does not melt like synthetic fabrics (polyester)
- *Lab coats never should be worn outside of the laboratory spa*

Source

Lab Coats

Unbuttoned

Source

Too short

Source

Short sleeves
Too short

Source

Safety Glasses and Goggles

- Eyeglasses are ***not*** a substitute for safety glasses or goggles.
- If you wear eyeglasses, be sure to use safety glasses that are designed to fit over them.
- If you do NOT wear eyeglasses, then do NOT use safety glasses designed to fit over eyeglasses.

Safety Glasses and Goggles

- We have several types of glasses and goggles available.
  - Take a minute to try on one of each type and look for proper fit.
  - Proper fit:
    - They do not slide down your nose
    - They come close to your eye socket and eyebrow.

Source

Source

Source

Safety Glasses and Goggles

- Safety glasses are of no use when they aren't on your face!
  - You should put on your safety glasses immediately upon entering the lab and not remove them until right before you leave.

Safety Glasses and Goggles

- Safety glasses are of no use when they aren't on your face!
  - If *anyone* in the room is still working on the experiment, then everyone in the room should still be wearing safety glasses.
  - Removing your safety glasses should be the ***very last*** thing you do before leaving the lab.
  - Do not push your glasses to top of your head.

Gloves

- Gloves are required when working in the lab.
- **However, you should *always* remove gloves before touching calculators, computer keyboards, cell phones, and writing utensils.**

Gloves

- If you must use your phone in lab, then it should wear a “glove,” too.
  - The same applies to your calculator.

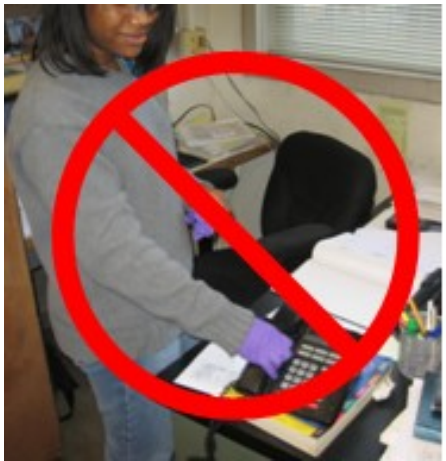
Gloves

- How can you take notes while following safe glove practices?
  - Wear a glove on your non-dominant hand but not on your writing hand. Use the gloved hand for manipulations and the ungloved hand for notes.
  - Use both gloved hands for manipulation, then remove the gloves to make notes.
  - Use both gloved hands for manipulation while your partner records data (without gloves). Be sure to record all your lab notebook before le space.

Source

Gloves

- Avoid touching your face or hair while wearing gloves.
- Gloves are never, ever to be worn in the hallways.
  - Never touch doorknobs and handles while wearing gloves.
  - Always dispose of gloves in the garbage cans provided in the lab space.



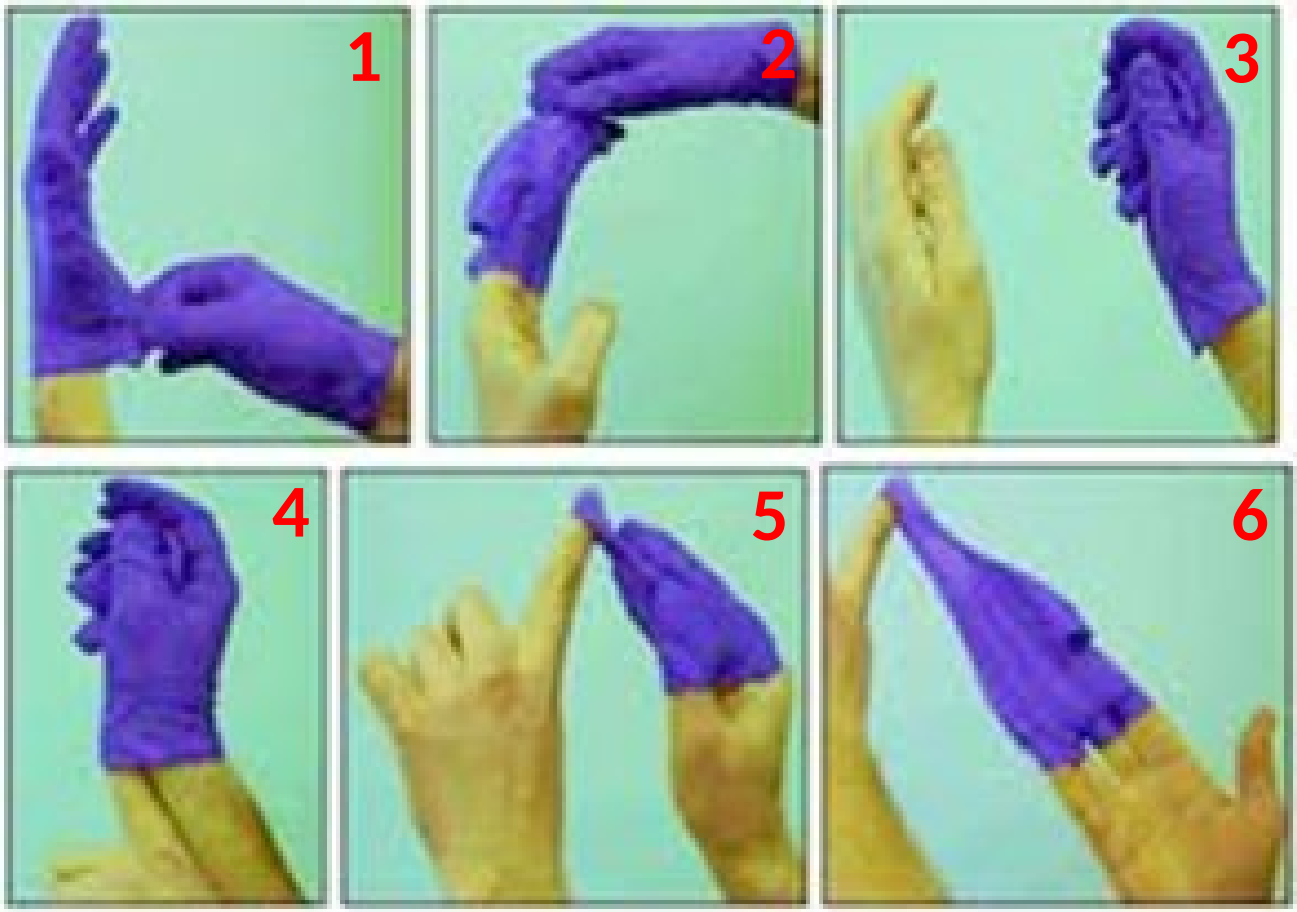
Gloves

- Change your gloves any time:
  - You suspect they have chemicals on them.
  - Any time you observe a color change.

Source

Gloves

- Proper glove removal:



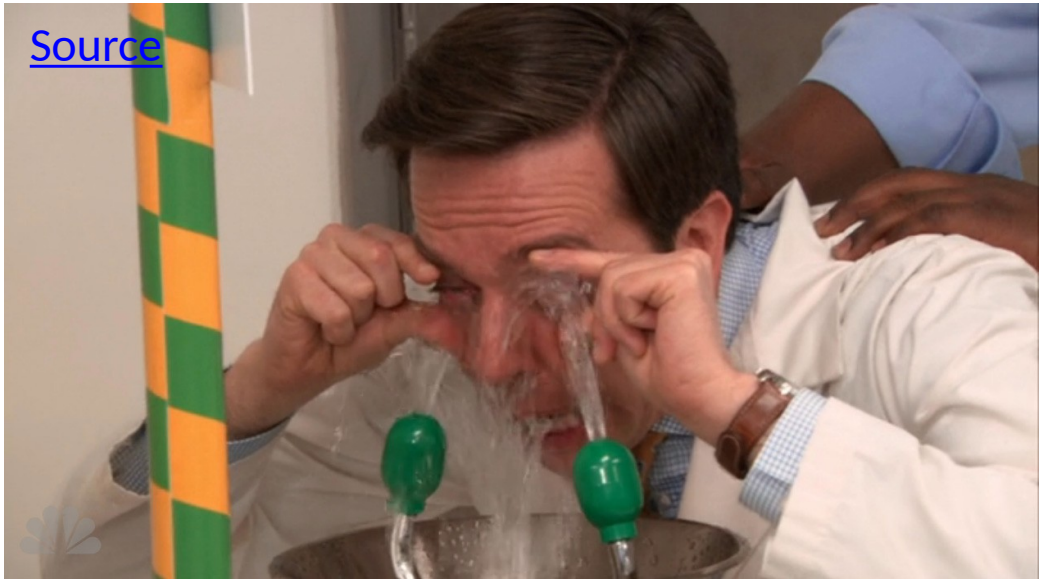
Source

Gloves

- Be sure to wash your hands when entering *and* leaving the lab

Eyewash and Safety Shower

- Look around the lab space and identify the eyewash and the safety shower.
  - Eyewashes must be used ***for a minimum of 15 minutes*** when there is any exposure of the eyes to chemicals used in the lab spaces.

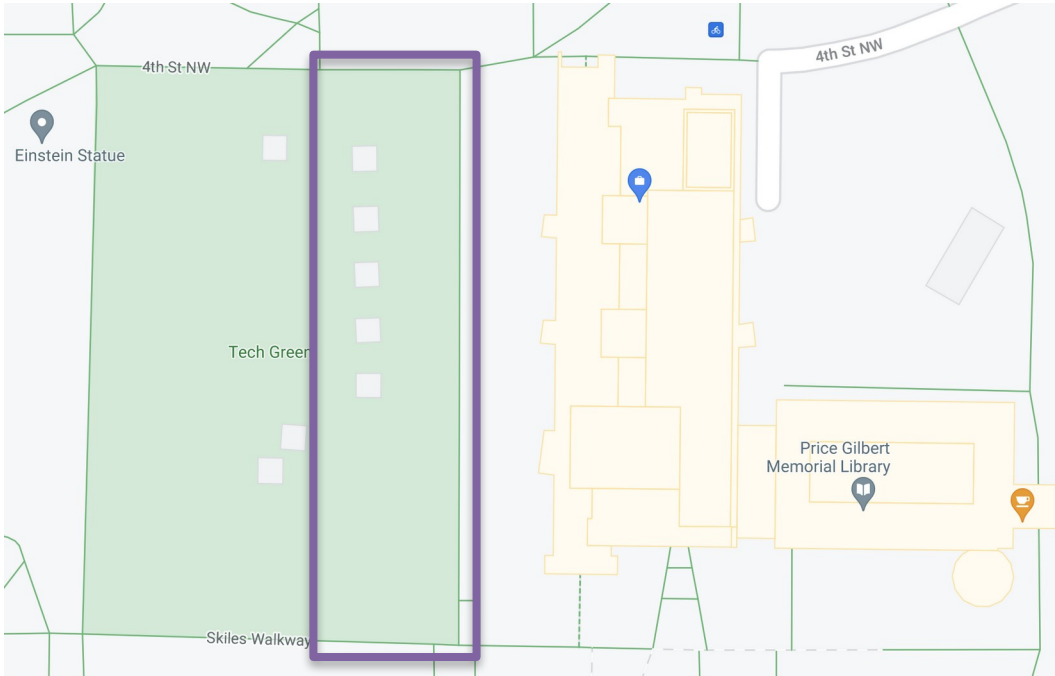


Emergency Exits

- Note that all the laboratory spaces in our program have two exits to the hallway.
  - Most also have at least one exit into another lab space.
  - ***In case of emergency, always use the exit nearest you.***
- In the case of building evacuation:
  - Remove gloves, leave all belongings, and ***exit via the stairwells at either end of the floor*** (whichever is closest).
  - Do ***not*** use the spiral staircase or elevators.

Emergency Exits

- ***You may NOT leave the Clough Commons area during an evacuation.***
  - Report to the appropriate rally point and await further instructions while we verify that we have accounted for everyone.
  - Exit on the side of the building closest to your lab room and rally on Tech Green



Emergency Exits

- Because we must account for all students during an evacuation, it is very important that you always let your TA know when you leave the lab space.

Fire Extinguishers

- Take a moment to locate the fire extinguisher in your lab space.

Source

Keep a Clean Workspace

- All bags and other personal belongings should be stored in the cubby-holes at the front of the room.
  - ***Do not block walkways by leaving items in the floor near your bench***.
- Keep laptops, pencil cases, and other personal items off of the bench tops where they are vulnerable to spills.

Source

Broken Glass

- Never place broken glass in the regular garbage can. This poses a huge risk to our facilities staff.
- Take a moment to locate the broken glass container in your lab space.
  - ***DO NOT*** put garbage in the glass boxes.

Source

Waste Containers

- ***Never*** dispose of chemicals down the sinks unless your TA explicitly tells you it is okay.
  - This is important in terms of protecting our drinking water sources and aquatic life.

Waste Containers

- We provide waste containers for most experiments. *Read the label before you add waste and make sure it's compatible!*
  - They always will be located in the fume hood, and they should stay inside the secondary container.
  - ***Pay attention to the level of liquids in waste containers.***
    - Alert your TA if your containers are getting full.
  - Be sure to open the top of the funnel before pouring.

Source

She should be wearing gloves, and the bottle should be in a secondary container!

Accidents

- Notify your TA of any spill or accident, no matter how small you think it is.
- *Don't be ashamed to report an accident. It's the right thing to do! We need to know so that we can work on preventing future accidents, not so that we can "punish" you.*

Source

See Something, Say Something

- Lab safety is a community responsibility.
- If you see a classmate doing something that is unsafe, then gently remind them of safe procedures.
- If someone gives you a safety reminder, please try to accept it with good grace. They are just trying to help keep you safe!