

Chemistry 3A

Introductory General Chemistry

Lab Safety

Lab Safety

- The first discussion in a lab course
- A priority for:
 1. Your fellow students
 2. Your instructor
 3. The org
 - ☐ Chemistry Department
 - ☐ Math, Science and Engineering Division (MSE)
 - ☐ Fresno City College (FCC)
 - ☐ State Center Community College District (SCCCD)
 4. The People of the State of California: regulations and law

The Lab Safety Contract

Pages 5, 6 and 7 in Lab Manual

PERSONAL PROTECTION

- Eyes: approved safety GOGGLES (not glasses)
- Body/clothing: lab coat to knees (at least mid-thigh)
- Below knee:

- Your body needs to be entirely covered: shorts, and skirts (which expose thighs) are not allowed at all times in the lab.
- Your feet need to be entirely covered: flip-flops, any open toed shoes or uncovered heels are not allowed in the lab.

- Long hair, accessories, scarves

- Hair longer than shoulder length needs to be appropriately tied back.
- You should not wear dangling jewelry or any loose, baggy garments, scarves, as to avoid undesired unplanned contact with any chemicals.

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PERSONAL PROTECTION (cont.)

- No eating, drinking, chewing, applying cosmetics
- *Thirsty? Need to drink water?*

Step outside lab but only when
you are not monitoring an experiment

- Be attentive about hand-washing
if you have handled any equipment and especially chemicals,
wash your hands first before you step outside and if you
might put your hands on face/eyes, food, or whatever
- Some experiments will require use of hand protection
with nitrile gloves, which will be provided
Always use appropriately fitting gloves: if your hand is too
small for the glove, you may not have an effective grip

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COMMUNITY PROTECTION

- Learn first thing where these are:
 - Fire extinguishers
 - Fire blankets
 - Fire alarms
 - Safety showers (yes, you will get soaked)
 - Eyewash fountains
 - First Aid Kits

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COMMUNITY PROTECTION

- Lab aisles and corridors must be clear and trip-free of lab equipment, backpacks, chairs out of their place
- Access to exits and emergency equipment unobstructed
- Chemical reaction going on?
Keep your attention on it frequently if not constantly, and especially if it's your first experience, first time performing the operation!!

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POLITENESS & CONSIDERATION

- **Always leave a place in the condition as you found it**

And if you find it in awful condition, let me know, so I can tell you how you should leave a place in proper condition

- Clean up after yourself
- NO CHEMICAL WASTE OR ANYTHING ELSE IN SINKS!
 - Everything to be disposed has a proper container, whether it is a solid (paper towels, matches, &c) or a liquid

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- Broken glassware? We have a place for it
- Pieces of glass on floor/bench?
 - **NEVER** grab broken glass with your hand, gloved or otherwise!
 - **ALWAYS** find a (hand)brush and collecting/dust pan and sweep broken glass into the pan
- Inspect your glassware before experiment: make sure you do not use dirty or chipped or cracked glassware

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- Inserting glass tubing & thermometers in holed stoppers
 - Very avoidable injuries are caused by wrongly inserting glass tubing into holed stoppers!
 - Apply glycerin (or at least dishwashing detergent) to the hole and surface of tubing
 - Push tubing into hole, using a rotating motion
 - Insertion should be with ease and no great resistance
 - Do not have the tubing insertion and your palm in same path!
 - Wash stopper & inserted tubing liberally with water when done
- Unfamiliar with glassware? Ask instructor what it is and what it's used for

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HOT STUFF

- Always consider glassware to be hot if around heating equipment
 - Handle hot glassware with tongs or hot pad
 - Keep hot glassware on equipment intended to hold it until the glassware is cooled. Do not set hot glassware on cold surface, including just the bench
- Heating a reaction in a test tube?
 - The mouth of the tube should always be pointed away from any person!
 - At the appropriate moment in the semester, videos will be required viewing for heating reactions in a test tube



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HOT STUFF

- **No heat source unattended ever**
- Gas burners and hot plates off when not in use
- Using a flammable solvent or liquid?
 - Those should only ever be heated using a hot plate, and usually in a water bath heated by the hot plate
 - All reactions involving VOLATILE solvents/liquids **MUST BE DONE** in a fume hood
- Make sure that the sash of fume hood is at the proper setting and learn the safety features (alarms) of the fume hood

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HANDLING CHEMICALS

- Treat all chemicals as a safety concern
- Pipetting by mouth is strictly forbidden
Use a proper volumetric transfer device or system, like a pipette bulb
- Never put your nose over a container with a substance in it

If you absolutely must sample the volatile substance by smell, use your hand to fan vapors from mouth of container towards your nostrils carefully

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HANDLING CHEMICALS

- When you take a solid or liquid stock chemical out of its container, you should not put excess chemical back in that container

For this reason, it is better to take smaller quantities at first and add to the weighing dish or volumetric container than take too much in one big over-do

- Never waste reagents and consumables
 - If an experiment says to weigh out 10.0 grams of a chemical, take the time to weigh that out accurately
 - If you want 250 ml of liquid, generally take that amount and not more
 - You have a community to consider, and they are in the queue not wanting to find out nothing is left for them

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HANDLING CHEMICALS

- Having problems getting a solid or other thing out of a reagent container? Inform the instructor.
- If you're getting a reagent, particularly a liquid stock, out of its container, make sure that if it drips down the side of the container when dispensing, that it does NOT drip on the identifying label. Handle the container directly on the label.

ACIDS

- **ALWAYS** slowly add concentrated (stock) acids to stirring (or at least swirling) water during dilution
- **NEVER** add water solvent to concentrated acids: the heat of the reaction can be very intense and can cause EXPLOSIVE release

Other Useful Info

- Whiteboards

- Microfiber cloth or eraser is usually enough
- If board staining is seen after cloth cleaning, try a 50% isopropanol (1:1 [v/v] rubbing alcohol:water). Wet a cloth and quickly apply
- A more determined effort can use high concentrations of isopropanol
- Do **NOT** use any cleansers or detergents on whiteboard, and that especially includes Simple Green used in the lab