

Reminder: These notes are meant to supplement, not replace, the textbook and laboratory manual.

Laboratory Safety

1. Exposure to chemical substances in the laboratory can cause a number of health problems, and you should handle chemicals with care at all times. Some of the problems are:

Carcinogens: Substances or agents that cause cancer (tumors). Examples include benzopyrene (the first carcinogen ever identified; most often found in smoke), aflatoxin (generated by a mold that grows in improperly stored peanuts), and chloroform (CHCl_3 , found as a trace contaminant in chlorinated drinking water).

Teratogens: These cause birth defects. The most notorious example is probably the drug thalidomide, which caused thousands of severe birth defects abroad in the '60's, but was denied certification in the US.

Mutagens: These cause mutations (inheritable genetic changes). These changes affect the offspring only; comic-book mutations that change the person exposed (e. g. the bite of the radioactive spider that gave us Spider-Man) are not mutations in this course.

Lachrymators: These cause tears (eye irritation). Example: tear gas.

Corrosive: These cause visible destruction of human tissues, or irreversible changes in them. The most common examples are acids and bases.

Flammable: These substances ignite easily and burn readily. Inflammable means the same thing, which you would not expect from your knowledge of Latin prefixes. Examples: acetone, ether, ethanol, and most other organic liquids and some solids that do not contain halogen atoms.

Nonflammable: These do NOT ignite easily or burn readily.

2. Here is a list, with descriptions, of some of the safety equipment in the lab.

Safety goggles: Every student must wear these at all times in the lab. You must wear them even if you've finished your own experiments, because somebody else who is still working might have an accident that sprays your eyes with chemicals. **THE ONLY EXCEPTION:** If nobody is performing experiments at all (e. g. during exams and lectures), it isn't necessary to wear them.

Lab coat: Every student must wear these at all times in the lab. Your lab coat is more than a symbol saying that you're in the sciences, it's a layer of protection between you and laboratory hazards.

Fume hood: They're around the periphery of your organic lab. You will perform experiments that produce hazardous and smelly vapors in them. To save energy, keep the hood window closed when you're not working directly on your apparatus.

Eyewash fountain: If you spill chemicals in your eyes, this is what you use. You may need help finding the eyewash fountain; don't hesitate to call for it. Aim the spray into your eyes and wash them out for ten or fifteen minutes at least. It'll be hard to open your eyes, but you must.

Safety shower: For use when you've spilled chemicals on yourself and your clothes. Stand under the shower and pull the metal triangle; floods of water will come down and wash you off. Lesser spills can be dealt with under the faucet, but in any case, use plenty of water.

Fire extinguisher: To operate, pick it up, pull the pin, aim the black cone at the base of the fire, and squeeze the handles. (You won't be able to squeeze the handles together if you don't pull the pin).

Working without supervision is not allowed. You must do all of your experiments in our labs during the assigned times.

3. Dealing with wastes in the chemistry laboratory: Here's what you do with it.

Organic compounds: There will be containers in the lab for the disposal of halogenated organic liquids, halogenated organic solids, non-halogenated organic liquids, and non-halogenated organic solids. Put each substance in its appropriate container. How to tell: Halogenated compounds will have things like fluoro, chloro, etc. in their names. On quizzes, compounds with melting points above room temperature are solids; if only a boiling point is given, it's a liquid.

Broken glass: Special boxes are provided for this.

Acids and bases: These can be disposed of down the sink, if and only if the quantity is small and you dilute them with plenty of water.

Ordinary (nontoxic) solid trash, like paper, goes in the trash can.

(In case you were wondering: Xavier's Safety and Environmental Officer arranges for contractors who remove our hazardous wastes for appropriate final disposal. This may include burial in special landfills and incineration.)

4. Here's what to do in case of emergency. If you see an accident, you should take the initiative yourself; your instructor may be across the room and may not have seen what happened. While you're dealing with the emergency, or just afterward, notify your instructor, but that's not the first thing to do under most circumstances.

Fire on a person: Stop, drop, and roll. The idea here is to get the source of the fire between you and the floor, cutting off oxygen to the fire and putting it out. Don't run to the safety shower (or anywhere else). Running fans the flames, making things worse.

Once the fire is out, get under the safety shower and cool the burned area down.

Fire elsewhere: Put it out with a fire extinguisher. For instructions on how to use a fire extinguisher, see section 2 above.

Chemical spills on the floor or desktop: Wipe it up with the appropriate type of absorbent. If you don't know what that is, ask your instructor.

Chemical spills on the skin or clothes, or in the eye: Use the safety shower or eyewash fountain, as described in section 2 above.

Cuts: remove any foreign objects from the wound and apply pressure directly down on it. Tourniquets are for use in life-threatening emergencies only.