Laboratory Safety Walkthrough

Safety Equipment

· Identify locations of **safety showers**, **drench hoses**, and **eye wash stations** (eye wash stations should be flushed weekly)

· Know where **fire extinguishers** are located and their types (red A/B/C extinguishers are for wood and paper/oil and solvent/electrical fires; yellow D extinguishers are for metal fires)

· Know where the **emergency gas shut off switches** are located

· Know where the **emergency phones** are located and keep a sheet nearby with important numbers to call in the case of accidents, large spills, emergencies etc.

· **First aid kits** should be in every room (preferably near the office or in the glass cabinets across)

· Know the different types of **spill pads** (eg. gray/yellow pads for water and chemical spills) and the different types of **spill kits** (acid neutralizer eg. $NaHCO_3$ (s), volatile solvent powder, etc.)

Chemical Storage and Waste

· ***Chemical Cabinets***

o Keep them closed all the way

o Let someone know if there's a bad smell, it's probably not ventilating or stored correctly

o Store only chemicals that are compatible with one another in the same cabinet

o **Corrosive** cabinets are located under each hood; these are for acids and bases, which should be separated into different cabinets or bins

o **Cyanides** are segregated and their cabinets should be kept locked when not in use

o **Flammable and combustible** materials should be stored in ventilated cabinets or refrigerators marked "FLAMMABLE"

o All liquid chemicals should be stored in secondary containers that meet or exceed the volume of the liquids

· ***Chemical Waste***

o Identify signs for **satellite waste accumulation areas**; identify rectangular bins and cabinets where waste should be kept

o Large white **carboys** are for unreactive aqueous *or* solvent waste

o **4 L bottles** are for general reaction and sink waste; they can be kept in the sink inside a secondary container that is without residue or liquids

o **Sharps waste** (use for needles, syringes, razors etc., keep capped, properly close and dispose when full)

o **Solid waste drums** are for silica, Celite®, cotton, etc.; no metals

o Use individual **heavy metal** waste containers

o **Glass waste** boxes need thick plastic liners (test tubes, pipets, broken glass etc.)

Biosafety

o Mark instruments in contact with biomaterials with biohazard stickers

o Clean spills of biomaterials with bleach and/or ethanol

o All biological waste must be autoclaved before disposing

o Disinfect cultures with bleach before disposing of them

o Use proper PPE and biosafety cabinet for the appropriate biosafety level of the lab

Laser Safety

- Always wear laser protective eyewear for the appropriate optical density (OD) for the wavelengths and power levels of the laser in use
- Have the standard operating procedures (SOP) posted for each laser
- Avoid using beam paths at sitting or standing eye level
- Use outside warning light when laser is on and warn all personnel in the lab that the laser will be turned on
- Remove jewelry that might reflect beams
- When aligning the laser:
    - Reduce the power or use alignment laser
    - Survey the area for reflections and confine any possible reflections to the laser table
    - Minimize the number of personnel present during the alignment

High Voltage Safety

- Work on un-energized circuits whenever possible
- Be careful around live 60 Hz electricity
- Limit the current and energy to the lowest values possible
- Be aware of where there is high voltage, and maintain your distance from live high voltage circuits
- Properly ground any high voltage circuit, especially any large capacitors, before working on it
- Use high voltage probes to check voltages when necessary
- Always work with a partner who is also knowledgeable of the system and is aware of the risks and hazards

General Safety Advice

- Use masks when working with silica or work exclusively in the hood
- Do not wear PPE in community spaces (i.e., kitchens, bathrooms, instrument center, outside the building); if you need gloves to transport chemicals, keep one hand ungloved while in hallways to touch door handles
- Keep floors clear of debris and solvent bottles
- Consult with labmates before working with unfamiliar or dangerous reagents, especially pyrophorics, HF, gas tanks, cyanides, and stills
- New students should not work alone until they are comfortable and familiar with the risks of their chemistry (never perform new, highly dangerous or large scale reactions alone)
- Always use a carrier to transport chemicals or reactions outside the lab
- Use the near miss reporting feature on the JST website (http://jst.chem.yale.edu/safety-incidents)
- Use overnight reaction cards on your hood during scale up or hazardous reactions (http://jst.chem.yale.edu/resources/fliers)
- Use signs to block off an area where a spill has occurred (http://jst.chem.yale.edu/resources/fliers)