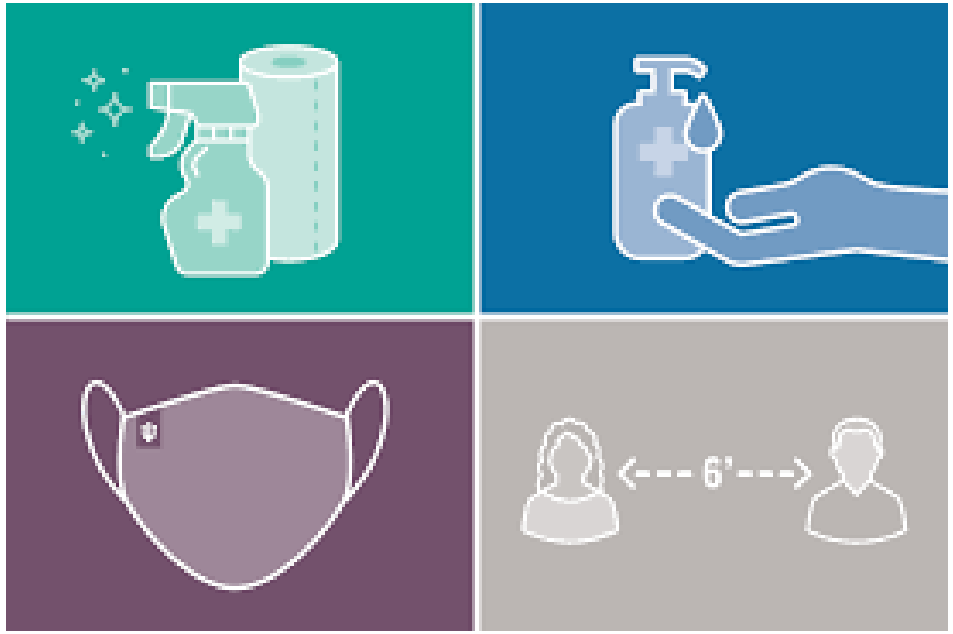
SAFETY TRAINING

JOINT SAFETY TEAM

JANUARY 2021

WRITTEN BY SUZANNE SZEWCZYK AND ABI HEUER

PRESENTED BY THE JST



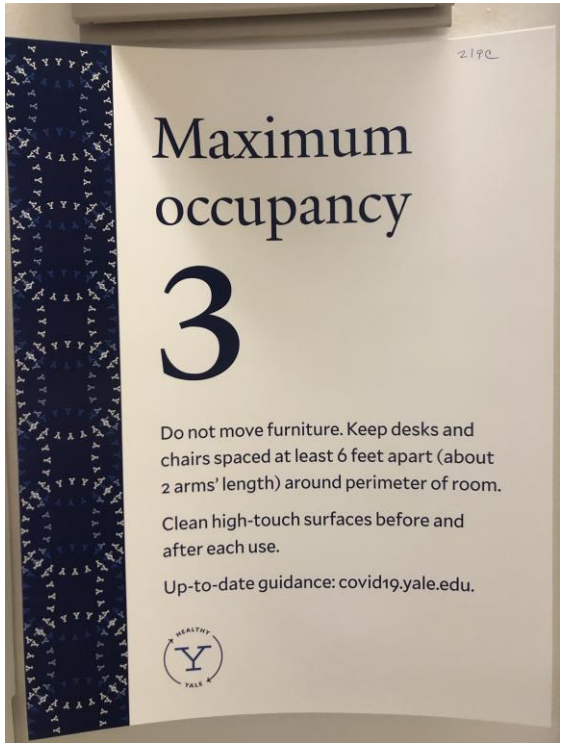
COVID SAFETY

MASKS

- Masks are to be worn at all times except when eating or drinking
- Cloth masks should not be worn in the lab
- Fire Resistant masks provided by the department

OTHER COVID SAFETY

- Complete daily health check: https://covid19.yale.edu/health/daily-health-check
- Pay attention to room capacities
- Follow social distancing
- Get vaccinated! https://covidvaccine.ynhh.org/
- Report COVID-19 issues to COVID hotline:
  - 203-432-660
  - Scott Miller (scott.miller@yale.edu)



JOINT SAFETY TEAM

GENERAL SAFETY

PPE

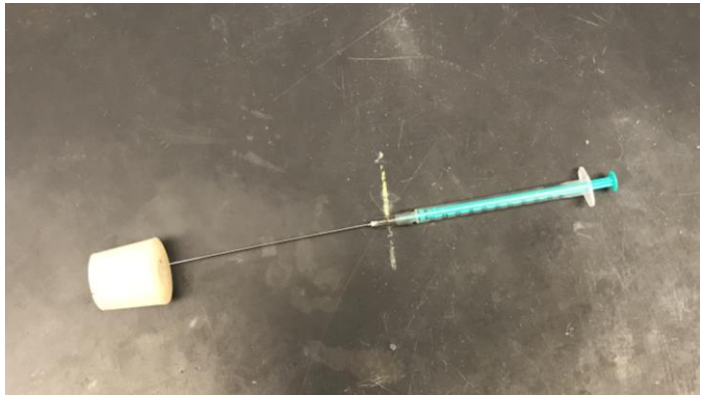
- Safety goggles
- Lab coats
- Gloves
- Appropriate attire

- Practice good chemical hygiene
  - Keep out of NMR rooms, group rooms, offices, kitchens and bathrooms
  - Launder lab coats through the stockroom

CHEMICAL TRANSPORT

- Carrier for transport
  - Chemical or reaction transport outside of or between labs
  - When in doubt use a carrier!

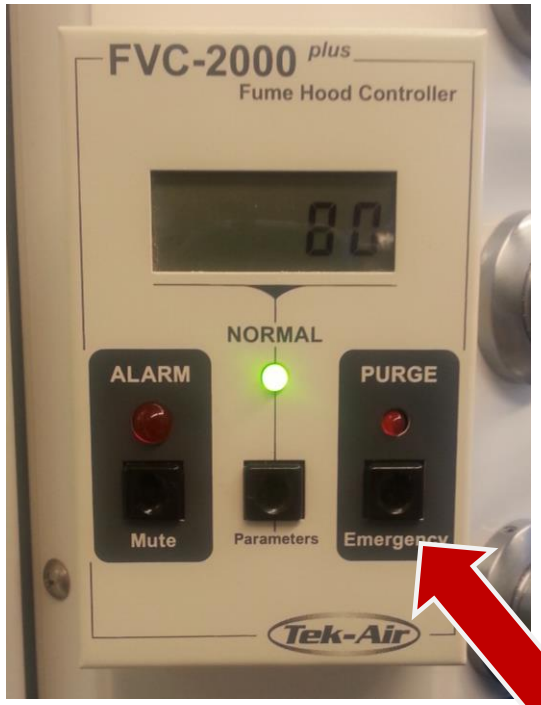
- Stoppers for needles and cannula
- One-glove rule



FUME HOOD SAFETY

- Work in the hood as much as possible and keep your materials there when in use
- Emergency exhaust is useful for gasses, excess vapors, spills or odorous materials

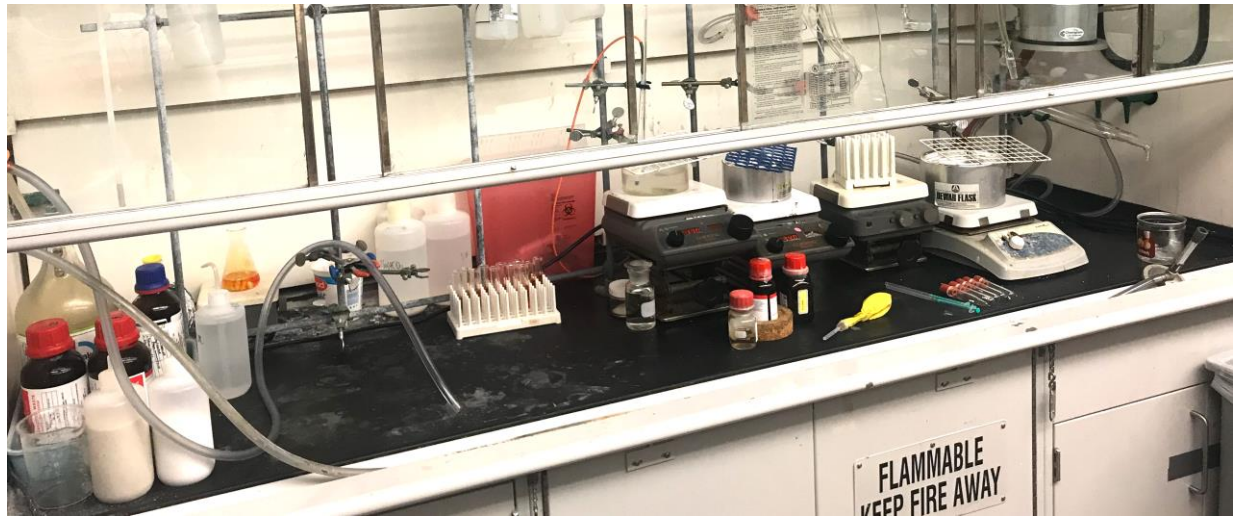
~100




FLAMMABLE
KEEP FIRE AWA

FUME HOOD SAFETY

- Hood sashes
  - Do not work with the sash all the way up
  - Decreased ventilation for you AND nearby hoods
- Keep work areas clean from clutter, unlabeled materials, spills and uncapped needles

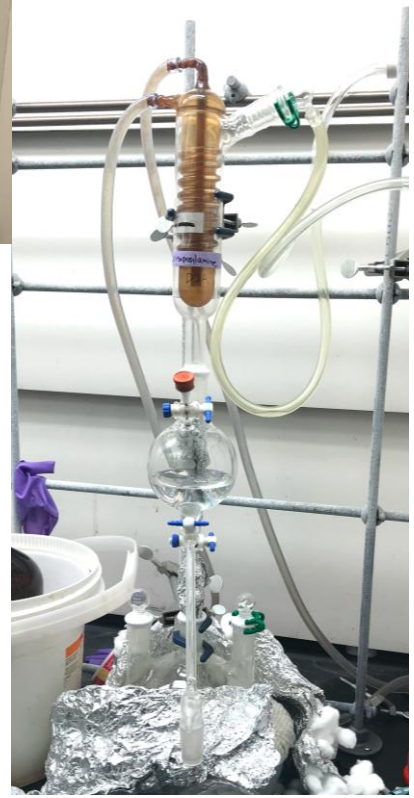



FLAMMABLE
KEEP FIRE AWAY

GET TRAINED!

- Glove boxes
- Solvent dispensary systems
- Stills
- Gas canisters

Amine still



- Pyrophoric chemicals
- Reactions under pressure
- P-listed/acutely toxic materials
- Cryogens

SDS

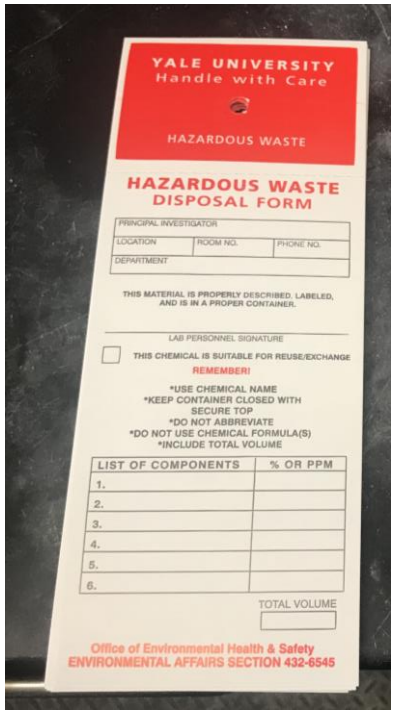
CHEMICAL STORAGE AND WASTE

CHEMICAL STORAGE CABINETS

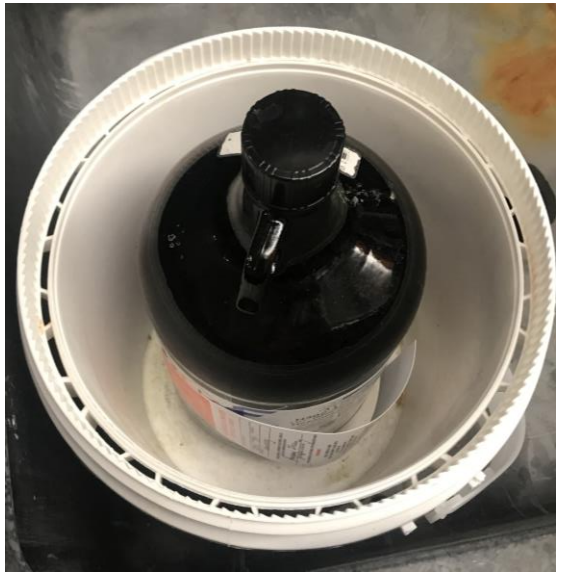
- Corrosives
- Flammable
- Specially rated freezers and refrigerators
  - Segregate incompatible chemicals like acids/bases, oxidants/reductants and waste from reagents

MIXED CHEMICAL WASTE

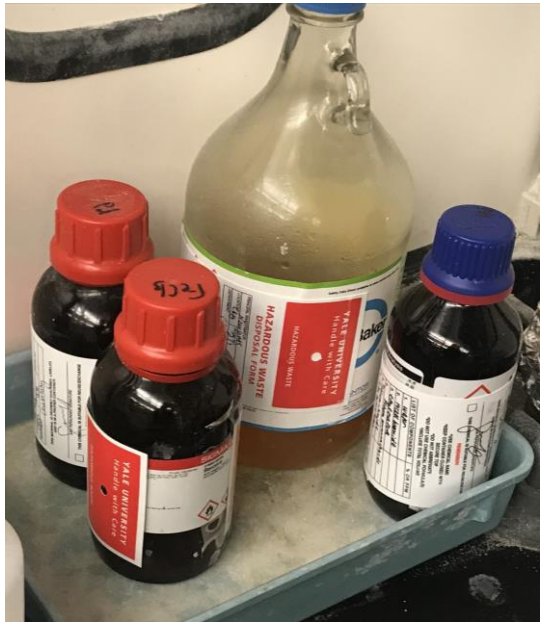
- Waste labels
  - Spell out all contents
- Waste bottles in clean dry secondary containers



General "sink" waste



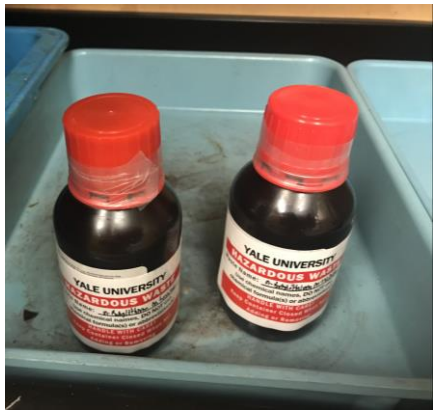
Specific waste like transition metals, aqua regia



USED BOTTLES

- Empty bottles are rinsed and labels are crossed-out
  - Recycle or put in glass waste
  - Don't let build up
- "Bad" or hazardous reagents can be labeled and left for pickup

Lab recycling

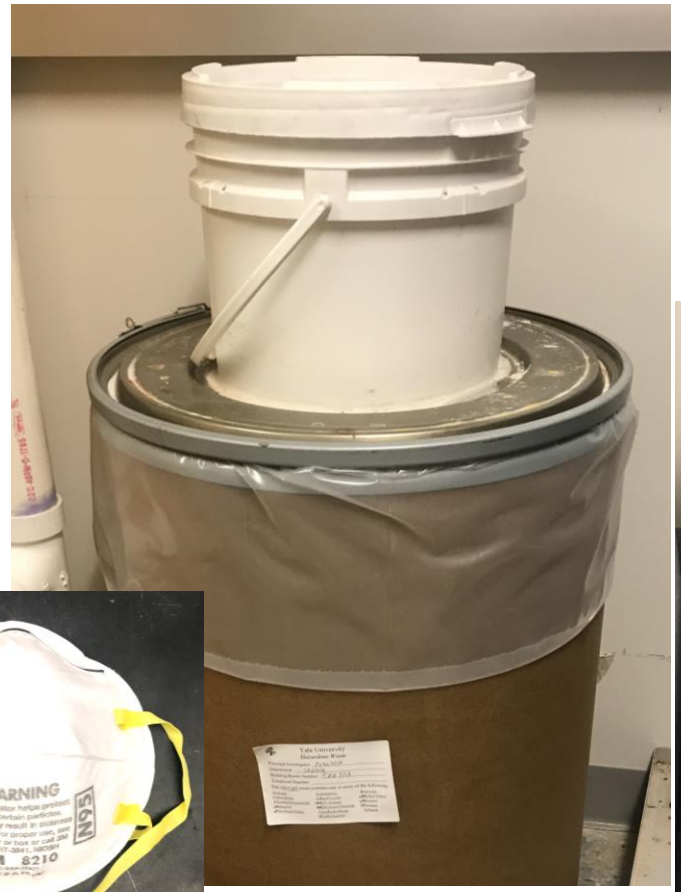


Bag for compromised bottles

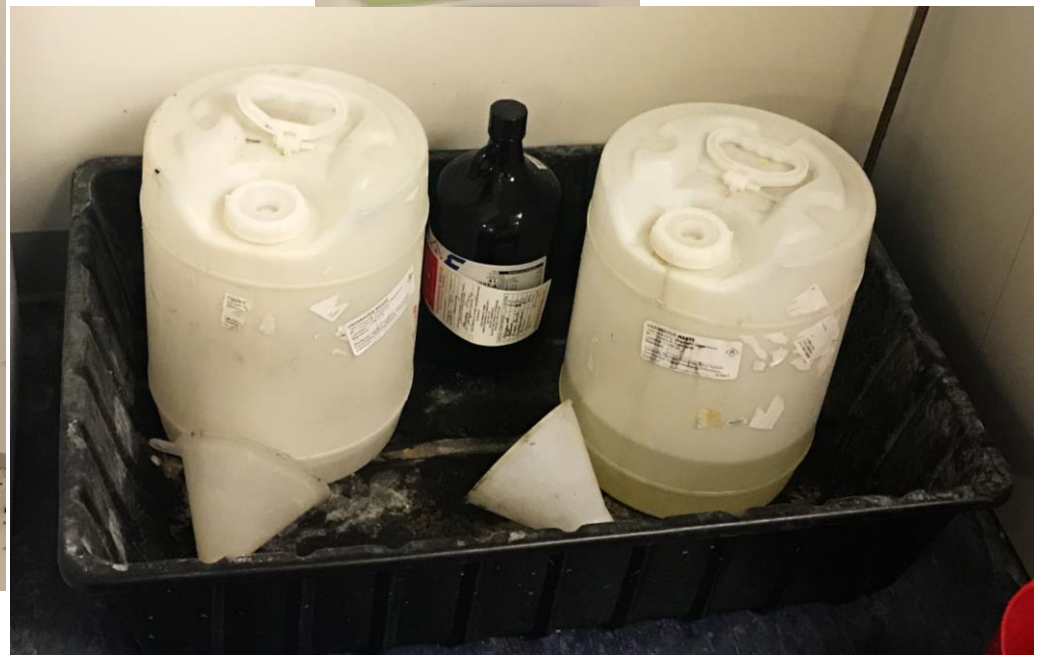
SOLID AND LARGE VOLUME WASTE

- Solid waste
  - No organometallics
- SiO_2 mask
  - Available in stockroom
- Satellite Accumulation Area
  - Carboys and waste for pickup

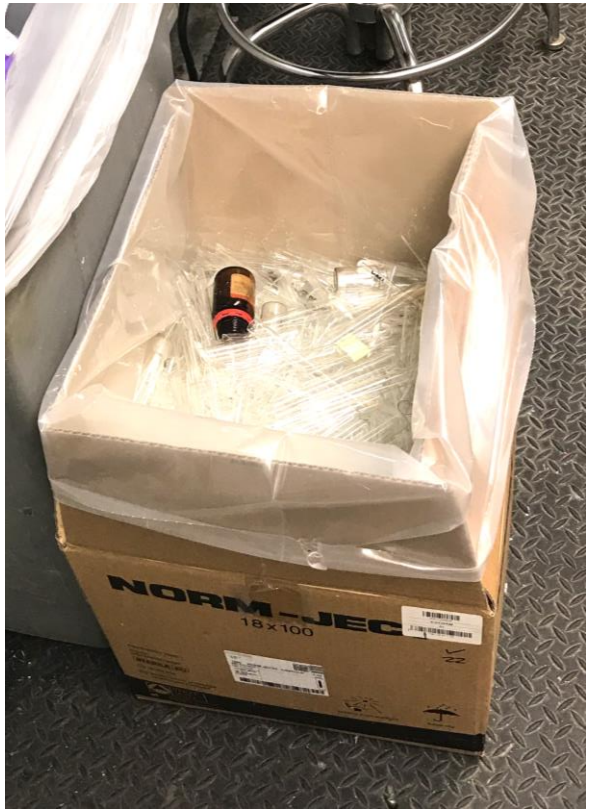
Solid waste drum



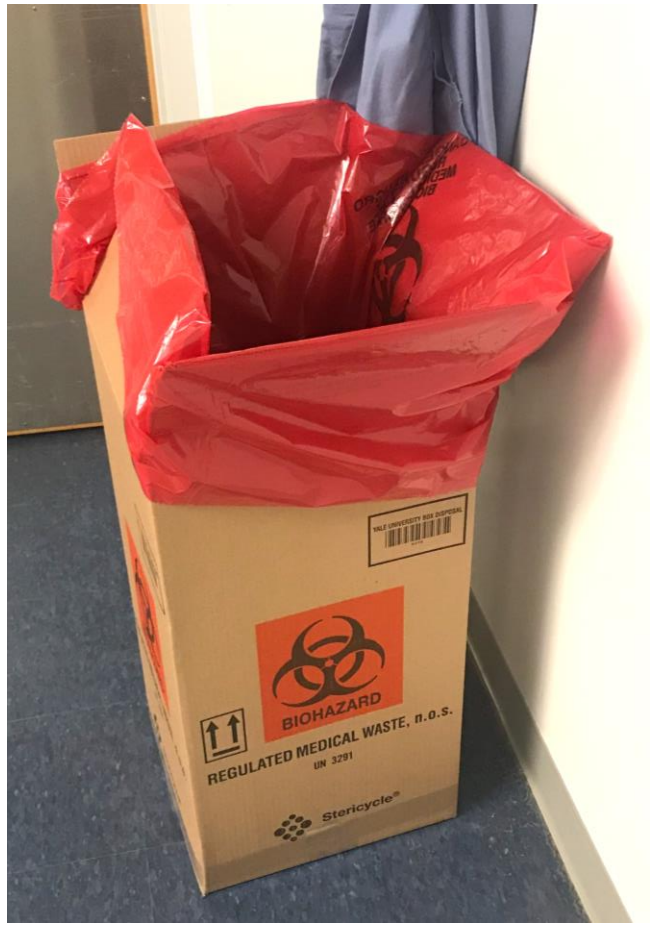
SAA



GLASS AND SHARPS WASTE



Pipets, broken glass, test tubes, empty and clean glass bottles

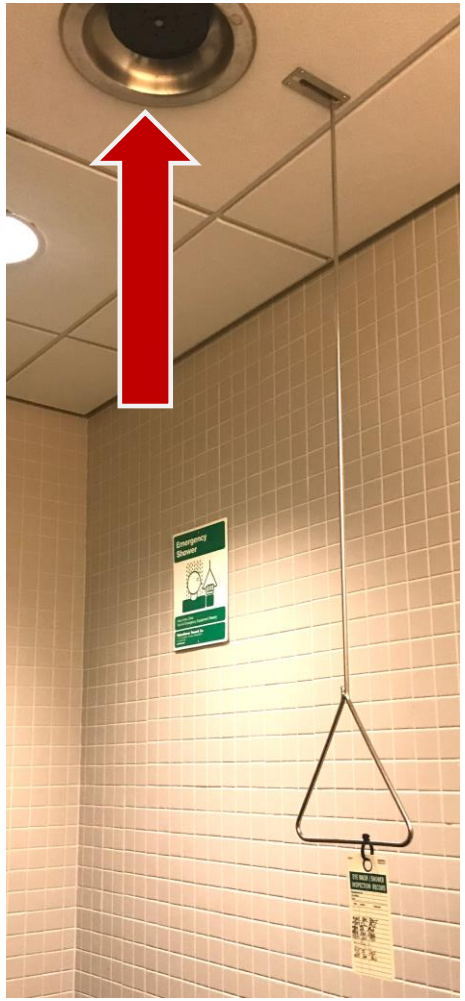


For full sharps boxes

SAFETY EQUIPMENT AND EMERGENCY RESPONSE

SAFETY EQUIPMENT

- Safety Showers
  - Remove all clothing to eliminate contact with the material and chemicals pooling
  - Rinse for >15 min
- Drench hoses



EYE WASH STATIONS

- Flushed weekly for a few minutes each time


FIRE EXTINGUISHER

FIRE EXTINGUISHERS

- Red ABC
  - Oil, paper, solvent, electrical fires

- Yellow D
  - Solid Na, Li, K and other elemental metals

- Emergency gas shut off

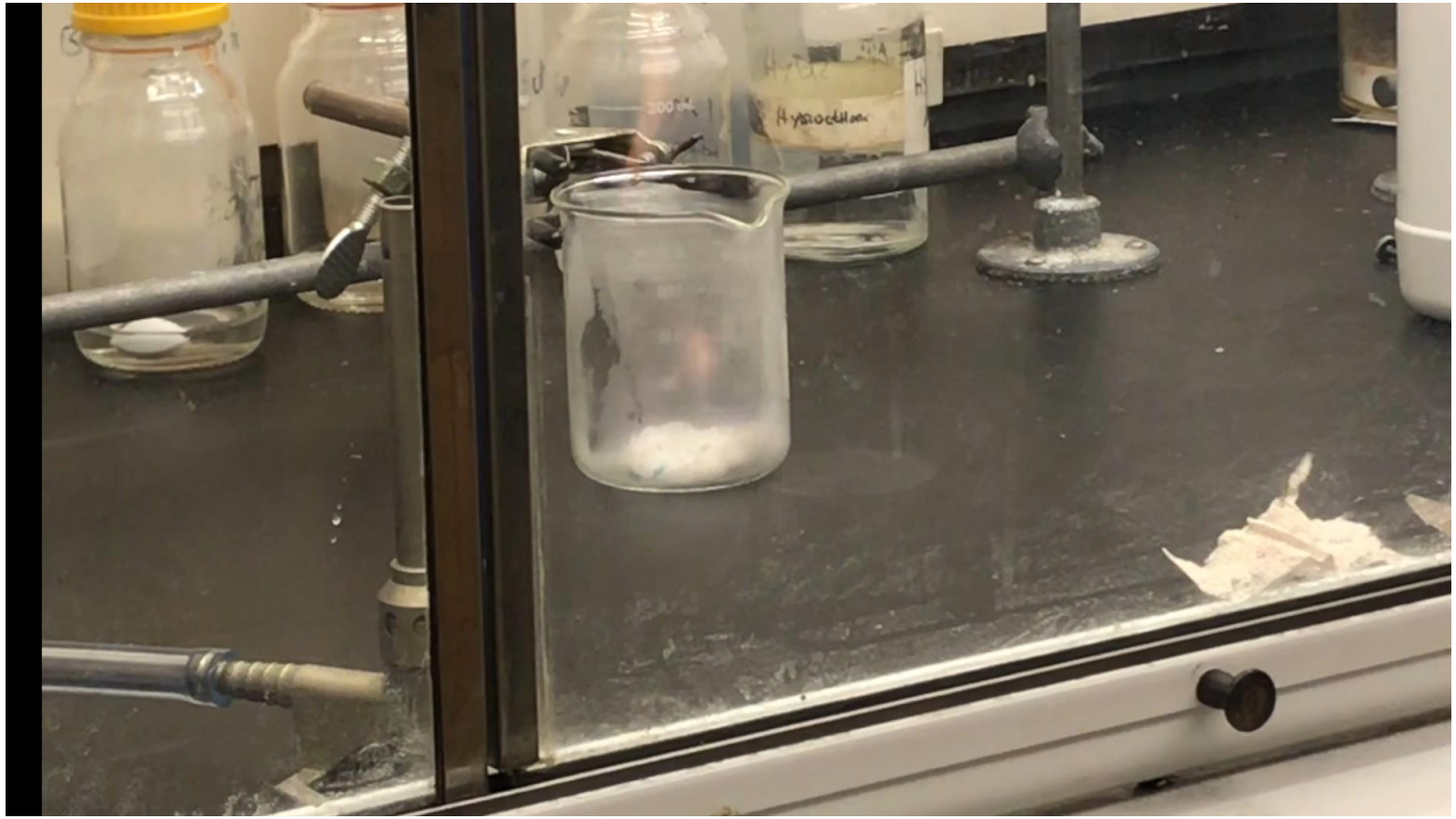
CRB

KCL

All fire extinguisher use must be reported promptly to EHS

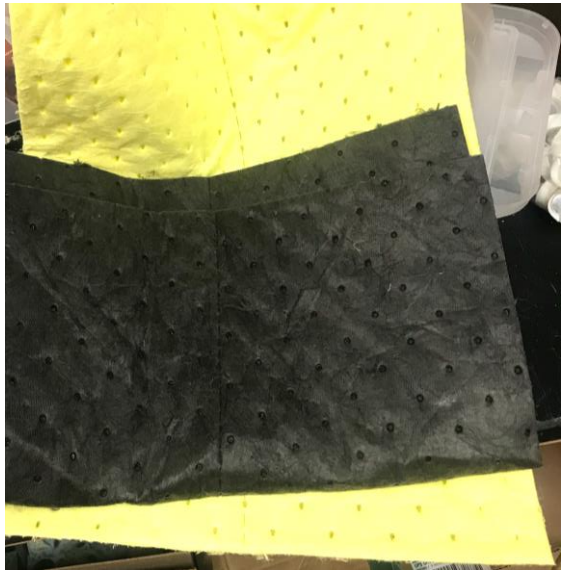
SMALL FIRES

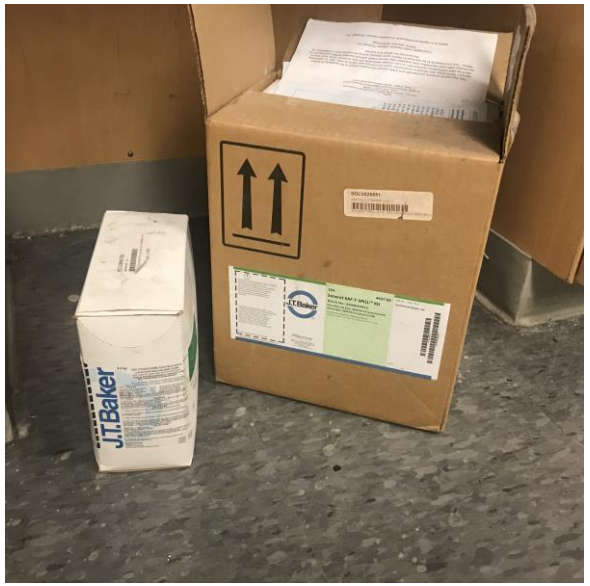
- Try to smother small fires with sand, salt, a spare fireproof lab coat or a lid



CHEMICAL SPILLS

- Spill kit and pads
  - Solid $NaHCO_3$ for acids
  - Citric acid for bases
  - Solvent powders
  - All go into the solid waste after use





- Calcium gluconate for HF
  - Available in stockroom

EMERGENCY RESPONSE

- Emergency phone
  - Always call for large fires/extinguisher use, significant personal injury or property damage
- First aid kit
  - Available in stockroom

By Phone:
Main Line: 203-785-3550
Waste Line: 203-432-6545
Emergency Line: 203-785-3555

QUESTIONS?

- General Safety
  - PPE
  - Fume hoods
  - Further training
  - Chemical transport
- Chemical Storage and Waste
  - Hazardous chemicals
  - Waste labels
  - Sharps
  - Chemical organization
- Emergency Equipment and Response
  - Fires
  - Eyewashes
  - Safety showers
  - Chemicals spills

EMERGENCY SCENARIOS

1. Your return to your hood and find your oil bath smoking.
2. You knock over a bottle of a reagent in your hood and it spills out.
3. You hear a bang from your labmate's bench and realize their reaction exploded in the hood.
4. You are trying to separate two pieces of glassware when something breaks cutting your hand.
5. You notice gases pouring out of your waste bottle.
6. When working up a reaction a bunch of solvent spills down your arm.
7. You drop and shatter a large round-bottom full of an odorous materia.
8. You are flame drying glassware in your hood when the tip of a solvent bottle catches fire.
9. You are cleaning out an old flask when all of a sudden your eyes feel like they are on fire.

SO WHAT'S THE PROBLEM?

1. You observe your labmate pouring a large amount of waste down the drain.
2. Your walk into a large unidentified chemical spill that someone has left to "evaporate."
3. You notice a powerful smell coming from a chemical storage cabinet.
4. You notice someone is storing amine bases near strong acids.
5. Your labmate often leaves distillations unattended for extended periods of time.
6. You prefer to sit on a stool while doing most of your lab work at the hood.
7. You are working in lab late one night when an unknown alarm goes off.
8. Your labmate often wears their lab coat in the group room and bathroom.
9. You are heating a reaction in a microwave vial and later see a seriously bulging septum.

RESOURCES

- Near miss reporting: https://jst.chem.yale.edu/near-miss-reports-0
- EHS website: https://ehs.yale.edu/
- JST website: https://jst.chem.yale.edu/

Yale University

Yale Environmental Health & Safety

JOINT SAFETY TEAM

EMERGENCY SCENARIOS

1. Your return to your hood and find your oil bath smoking
    1. Immediately unplug the oil bath and turn on the emergency exhaust.
2. You knock over a bottle of a reagent in your hood and it spills out.
    1. Turn on the emergency exhaust and look at the MSDS of the material. Let the spill evaporate or clean up the spill with an appropriate absorbent.
3. You hear a bang from your labmate's bench and realize their reaction exploded in the hood.
    1. Turn on emergency exhaust and close the hood sashes. Contact your labmate so you can identify what they were working with and allow you or them to respond appropriately.
4. You are trying to separate two pieces of glassware when something breaks cutting your hand.
    1. Immediately flush it with water to remove any chemicals or glass shards then apply compression to stop the bleeding. Seek emergency care if necessary and be sure any blood is cleaned up.
5. You notice gases pouring out of your waste bottle.
    1. Try to quickly move the bottle to the hood and turn on emergency exhaust closing the panels. Do not cap! Evacuate if necessary or if you cannot move the waste.
6. When working up a reaction a bunch of solvent spills down your arm.
    1. Use a drench hose to thoroughly rinse the area after removing contaminated clothing.
7. You drop and shatter a large round-bottom full of an odorous material.
    1. Turn on nearby emergency exhaust. Evacuate the immediate area and block off entrances with signs to prevent others from encountering the spill. Call EHS for spill cleanup if necessary.
8. You are flame drying glassware in your hood when the tip of a solvent bottle catches fire.
    1. Put it out by smothering the flame potentially with a spare fireproof lab coat. Avoid squeezing the bottle especially if it is warm.
9. You are cleaning out an old flask when all of a sudden your eyes feel like they are on fire
    1. Try to contain the material and seek use of an eyewash.

SO WHAT'S THE PROBLEM?

1. You observe your labmate pouring a large amount of waste down the drain.
    1. Address the issue based off the environmental toxicity, local waste supply issues, and most acutely corroding seals or drain pipes leading to pipes bursting
2. You notice a powerful smell coming from a chemical storage cabinet.
    1. Let someone in the lab know as some incompatible chemicals may be stored together or a bottle may be leaking or not sealed correctly.
3. You notice someone is storing amine bases near strong acids.
    1. Let them know that this could lead to exothermic reactions of the reagents or vapors as well as the reagents going bad sooner.
4. Your labmate often leaves distillations unattended for extended periods of time.
    1. You should warn your labmate distilling to dryness can lead to explosions, decomposition of materials, fires or glassware cracking.
5. You prefer to sit on a stool while doing most of your lab work at the hood.
    1. Be aware that when sitting if you drop or spill something it will pool onto your lab causing burns/irritation that could have been avoided by standing.
6. You are working in lab late one night when an unknown alarm goes off.
    1. This could be a variety of issues worst being a leaking noxious gas tank and as simple as an old watch. It is best to seek the source of the alarm and proceeds accordingly.
7. Your labmate often wears their lab coat in the group room and bathroom.
    1. This will cause contamination of group spaces where many are not wearing lab coats with odorous and potentially dangerous materials.
8. You are heating a reaction in a microwave vial and later see a seriously bulging septum.
    1. Immediately close the hood sashes to prevent a larger explosion and then unplug the hot plate. The septum may need to be replaced or a larger vessel should be used before continuing to heat. A lower temperature may also be necessary.