BME 332
Biomaterials and Biomechanics Lab

Lab 0
INTRODUCTION AND SAFETY

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SAFETY

- Environmental Health & Safety Training for Biological/Chemical Research Labs

  - labs are dangerous; so be safe
  - if you have questions…ASK

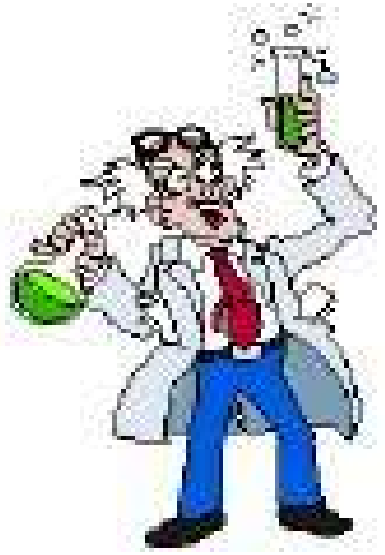
CHEMICAL HAZARDS

- Flammable / Combustible / Toxic
  - Respect all chemicals in lab

- If you can smell it…it is bad for you!
  - Use a hood if specified

- LABEL EVERYTHING!

Chemical Safety in the Laboratory



What is Hazardous Waste?

Material which poses an unreasonable threat to human health or environment

- Chemicals that are:
  - Toxins (cause death)
  - Volatile Organic Compounds (VOC)
  - Carcinogenic or Mutagenic
  - Have reproductive or neurological effects
  - Cause respiratory illness, i.e. bronchitis

How Do We Know What is Hazardous Waste?

- Material Safety and Data Sheet (MSDS)
- Some Chemicals are specifically listed by CAS# (Chemical Abstract Service) due to toxicity, ignitability, or other hazardous characteristics.
- All other chemicals have to be assessed according to certain criteria based on certain characteristics

Characteristics of Hazardous Waste

- Ignitibility
- Corrosivity
- Reactivity
- Toxicity

Ignitibility

- Meets one of the following conditions:
  - Liquid: Flashpoint of < 60 C
    - Acetone, ethanol, toluene, benzene
  - Solid: Capable of causing fire through friction, absorption of moisture or spontaneous chemical changes
    - Magnesium, calcium carbide, sodium
  - Ignitable compressed gas
  - Oxidizers
    - Chlorates, permanganates, inorganic nitrates, peroxiedes

Corrosivity

- Meets one of the following conditions:
  - Aqueous and 2 > pH >12.5
    - Concentrated HCl or NaOH
  - Corrosive to metal or skin
    - Liquid: Some amines
    - Solid: Sodium hydroxide

Reactivity

- Meets one of the following conditions:
  - Unstable and readily undergoes violent change w/o detonating, ex. potassium chlorate
  - Reacts with water or forms potentially explosive mixtures with water, ex. Na metal, Calcium carbide
  - It produces cyanide or sulfide gases when exposed to pH conditions 2 > pH >12.5, ex. Sulfide containing waste (Na_2S)
  - It is capable of explosion or detonation, ex. Almost everything (under right condition)!

Toxicity

- Basic rule: If it contains heavy metals, it's toxic waste
  - Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver
- Organic solvents (pass through skin)
  - Chloroform, benzene

DOs…

- Know the hazards of the chemicals involved before handling them.
- Know the basic emergency response
- Always assume containers are contaminated
- Keep lab bench, storage areas, and floor dry and clean
- Put lids and caps back on bottles and jars
- Always add acid to water and stirr the solution while adding
- Wear:
  - Eye protection at all time during lab
  - Gloves and lab coat
  - Closed-toe shoes and pants!

DON'Ts

- Never eat, drink, or inhale any type of chemicals!
- Don't work in building alone
- Don't put used/ excess chemical back in the container
- Don't smoke in the lab
- Don't hold bottles with the neck alone

PROTECTIVE EQUIPMENT

- Lab coat
- Goggles – on at ***ALL*** times!
- Gloves – use them for everything
- Closed-toe shoes