

Good Laboratory Practices



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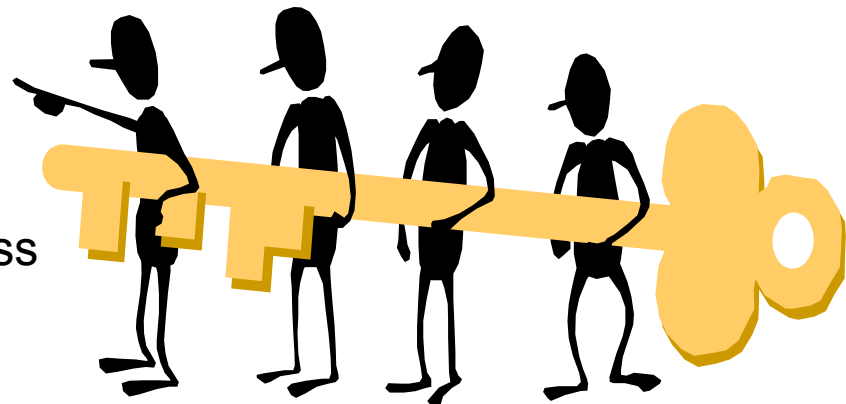
Outline

- Motivation
- Laboratory Practices
 - Lab safety
 - Working with others
 - Lab maintenance
 - Equipment use
 - Group dynamics
 - Ethics
- Additional Information

What is so important about good laboratory practices?

- Smooth operation
- Good support of group members
- Higher quality data
- Lower stress environment
- Practical preparation for life after school

Lab practices are a key role in our group success



Cosmo's latest quiz: Are you safe enough to be working in a chemical lab??

1. As you are getting dressed to come into the lab you:

- a. Jump into some shorts and slide into flip flops on your way out the door
- b. Pull on some jeans and tennis shoes
- c. Iron and coordinate a cute skirt and sandals

2. Upon arriving in lab you:

- a. Turn off the reaction you started the day before
- b. Turn on the radio
- c. Put on goggles and lab coat

Quiz Results: How did you do?

1. (b). Appropriate clothing for lab includes long pants and closed-toe shoes
2. (c). Protective wear may not be fashionable but a lab coat and goggles will keep you from getting splashed. Wearing gloves is also a good idea when handling chemicals

Quiz Continued

3. You finish mixing a monomer solution but need to leave it for later, you:

- a. Leave it in the beaker on the bench
- b. Place it in a jar and label it with your name, date, and contents
- c. Carry it with you back to your desk for safekeeping

4. While making an oil/water emulsion in the blender, you let the lid slide off and spray down the lab with liquid, you:

- a. Clean it up and inform others of a slippery floor
- b. Leave it to evaporate
- c. Throw down a few paper towels

Quiz Results: How did you do?

3. (b). Labeling all substances in sample bottles, jars, beakers, flasks, petri dishes, and bags is a necessity especially when working with potentially hazardous materials
4. (a). Cleaning up spills prevents others from hurting themselves. In case of a hazardous spill inform Scott Kelman immediately and close off the lab

Quiz Continued

5. You get a new chemical with a MSDS sheet so you:

- a. Recycle the MSDS sheet to help out the environment
- b. Place the sheet in a notebook of all MSDS sheets in the lab
- c. Put it in the fume hood and watch it fly around

6. You've been trying to dissolve your polymer in THF, but give up so you:

- a. Dispose the THF in a properly marked waste container
- b. Pour it down the drain
- c. Mix it with methanol to see what happens

Quiz Results: How did you do?

5. (b). It is a good idea to keep MSDS sheets on hand so that information can be found immediately. Also, a sheet of all chemical abbreviations should be posted in the lab
6. (a). Chemical waste should always be disposed of properly. Once waste containers are full, fill out the form and arrange to have it picked up

0-1 incorrect answers: Good job! You are not a hazard to yourself or others

2-4 incorrect answers: You should probably review a few more lab standards

5-6 incorrect answers: Don't touch anything!!!

Some additional points to consider:

- Keep laboratory doors unlocked while working
- Gas cylinder use:
 - Always strap to wall or bench
 - Check for leaks at initial use
 - Keep O₂ away from flammable cylinders
 - Turn off when not in use
 - Keep cap on when regulator is not attached
- Hot glassware should be placed in a special area
- Use fume hoods for volatile liquids
- When using vacuum ovens avoid pulling O₂ and flammable gases simultaneously or one after the other
- Students should complete a lab safety and fire training course



Waste Disposal

When you are ready to throw out old chemicals:

1. Label container with contents and approximate amounts. Do NOT put date on these containers.
2. Fill out the waste disposal form (found in gas lab 1.502A)
3. Leave for pick-up

Questions?

Contact Scott Kelman- Lab Safety Officer

Laboratory Practices: Working with Others

Be considerate of those working around you:

- Keep your area and common areas clean
- Throw away all trash and wash your own dishes
- Clean used equipment and return to proper storage
- Do not disturb others' experiments, including computers taking data

Working with Others (cont.)

- Clean up any spills and messes you have made
- Ask before disconnecting a gas cylinder from a system
- Do not store items or chemicals in the fume hood; this is unnecessary use of limited space
- Replenish depleted laboratory supplies; do not leave empty boxes sitting on lab benches for someone else to take care of

A good tip to keep in mind:

Your mom
doesn't work
here!!!



Laboratory Practices: Lab Maintenance

Vacuum Pumps:

- Use liquid N₂ trap
- Check oil level regularly
- Check oil color frequently. When the color turns dark, change the oil.
- If the pump is often used to pull organic solvent, change the oil at least once every 3 months

Lab Supplies:

- Replenish or reorder depleted items

Fume Hoods:

- Check for regular air flow
- Avoid using lightweight objects and paper in the hood

Group Computers:

- Keep all virus files updated
- Back up files regularly

Liquid N₂ and Gas Cylinders:

- Remove empty cylinders immediately
- Replace with full cylinders



Lab Maintenance: Special Equipment and Supplies

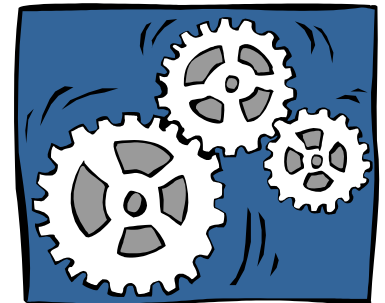
Group members with responsibilities:

- TOC: Alyson Sagle
- Millipore system: Conor Braman
- FTIR: Scott Matteucci
- Balances: Scott Kelman
- GC: Rajeev Prabhakar, Roy Raharjo
- UV-spec: Conor Braman
- Computer Back Up: Roy Raharjo
- Computer Software: Scott Matteucci
- Mac Computer Software: Keith Ashcraft
- Lab Supply Coordinator: Conor Braman
- Office Supply Coordinator: Sande Storey

Those in charge of equipment are responsible for their daily maintenance and for any problems that may arise

Laboratory Practices: Equipment Use

- Receive proper training on equipment before using it
- Use a sign-up sheet for equipment in high demand
- Create log for the vacuum ovens detailing the temperature, duration of use, and the owner of items in the oven



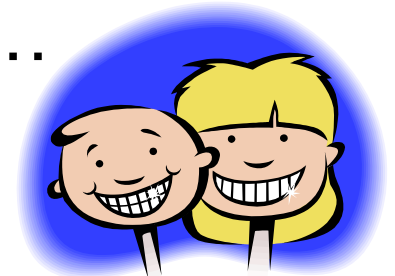
Laboratory Practice: Group Dynamics

The group changes every year; to ensure smooth transitions new members should:

1. Ask for help
2. Receive training on new equipment

And senior students should:

1. Make themselves accessible for questions
2. Not take new students' lunch money...



Laboratory Practices: Ethics

Main points from NSPE Code of Ethics

Engineers should:

1. “Hold paramount the safety, health, and welfare of the public.”
2. “Perform services only in their area of competence.”
3. “Avoid deceptive acts.”
4. “Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.”

Laboratory Practices: Ethics

Some Basic Responsibilities of a Scientist:

- Do not “fudge” data
- Avoid conflicts of interest
- Give credit when it is due
- Acknowledge previous errors
- Do not plagiarize

- Case Study

Additional Information:

- Summary will be posted on group website
- Resources on Ethics
 - www.nspe.org/ethics/eh1-code.asp
 - “On Being a Scientist: Responsible conduct in research.” 2nd ed. Published by Committee on Science, Engineering, and Public Policy. 1995
- Safety training course
 - www.utexas.edu/safety/ehs/index.html
- Other group websites
 - Georgiou: www.che.utexas.edu/georgiou/home.htm

Questions?
