

# Energy Conservation

## Inactive Equipment

- Shut off all equipment that can be shut off that does not need to be running. This may include:
  - Environmental rooms (warm & cold rooms)
  - Fume hoods
  - Ovens
  - Chilled centrifuges
  - Biosafety cabinet
  - Bubbler
  - Stirring Plates
  - Heater water bath on ROTOVAP
  - Heating block
- Check for and use energy-saver modes on all equipment
- Turn off screen savers on computers and opt for a power-save mode instead
- Use and maintain outlet timers and smart power strips to limit standby power usage
- Have a clearly stated equipment start-up and shut-down procedures available in a specified location at all times to ensure proper equipment use
- Report unused equipment on the UTransfer website so that it may be used by another lab
- Turn off lights when daylight is adequate, no one is using the room, or when a task lamp will do

## Fume Hoods & Ventilation

- Keep windows closed and hallway doors open to help save energy and allow for proper ventilation
- Help keep thermostats working efficiently by removing space heaters and ensuring thermostats are free and unblocked
- Shut the sash when you are done using the fume hood
- Never store chemicals in fume hoods

## Cold Storage

- Practice good cold storage organization
  - Nominate a cold storage coordinator for the lab
  - Create a database or inventory of frozen samples
  - Eliminate old or unnecessary samples
- Practice good cold storage management
  - Eliminate excess ice from freezers
  - Share freezers with colleagues
  - Increase the temperature in your freezers to the minimum required for lab safety or research integrity
  - Use appropriately sized equipment to avoid excess energy consumption
- Do not use incubators as refrigerators

# Waste Management

## Water Consumption

- Faucets have low-flow aerators to reduce water consumption
- Replace vacuum aspirators with membrane / diaphragm / oil-free pumps
- Use ice-makers efficiently and only as necessary
- Establish efficient lab-ware washing practices
  - Use appropriately sized equipment to avoid excess energy consumption
- Use appropriate water quality for each task
  - Avoid using distilled or deionized water when not necessary
  - If adequate quality water can be obtained by DI (distillation) or RO (reverse osmosis), do not use water stills
- Report leaks to facilities

## Lab Waste

- Only order from suppliers that do not use Styrofoam packaging
- Recycle ink/toner cartridges
- Recycle gloves (where possible)
- Purchase paper that is 90% recycled content (or higher)
- Identify the biggest waste streams in your operation and discuss alternative solutions with the Office
- Do not mix hazardous waste and non-hazardous waste
- Collect and recycle electronic waste
- Equipment and materials that are out of date but still usable should be donated to kids science camps / programs on campus

# Chemical Handling

## Green Chemistry

- Are you implementing the 12 principles of Green Chemistry?

## Non-Toxic Alternatives

- Use non-toxic chemicals whenever possible?
  - Avoid the use of unprotected metallic lead
  - Exchange or purchase spirit thermometers to replace mercury thermometers
  - Continuously purchase products without PVC, BPA, PBTs, or phthalates
  - Avoid the use of halogenated reagents
  - Use ethidium bromide alternatives
  - Digital processes instead of wet photographic processes
  - Use heptane(s) instead of toxic hexane(s)
  - Do not use HPLC-grade (or other anhydrous) solvents unless absolutely necessary
  - Use eco-friendly cleaning products

## Equipment Maintenance

- Are you ensuring equipment is properly maintained by the appropriate groups?
  - Check pump oil in the vacuum pump connected to the high vac / manifold line in fume hoods once per month
  - Use a trap to collect solvent and other volatiles that are pumped off using the vacuum line in the fume hood
  - Maintain nitrogen lines and regularly check for leak

## Chemical Management and Handling

- Seek ways to minimize chemical use
- Make use of the chemical inventory on campus and seek opportunities for safe chemical exchange
- Synthesize your own starting materials whenever possible
- Recycle and share oil baths
- Nuclear Magnetic Resonance (NMR)
  - Clean out and reuse NMR tubes
  - Recycle reiterated solvents from NMR experiments
- Recycle acetone used for rinsing glassware

# Best Management Practices

## Staff management

- Commit to holding semi-regular staff social events to encourage mindfulness breaks throughout the day
  - Lunch hour potluck
  - Yoga or physical activities
  - Board games
  - If adequate quality water can be obtained by DI (distillation) or RO (reverse osmosis), do not use water stills
- Encourage lab users to familiarize themselves with health and wellbeing services offered by the University
- Discuss the discrimination and harassment policy on campus with all lab users, and create a safe space to talk for those who need it

## Field Work

- Put in place a field work protocol to ensure the lab is conscious of environment when doing field work
- Reduce idling when on field work
- Be mindful of your transportation options and choose the most sustainable options when traveling to do fieldwork

## Purchasing

- When updating equipment, replace old CRT monitors with LCD monitors
- Purchase sustainable models of equipment whenever possible
  - E.g., Energy Star Certification
- Select the ideal size of equipment whenever possible
  - If your freezer is too large, you can either order a smaller freezer, or a larger freezer to share with another lab
- Use vendor equipment buy-back programs wherever possible
- Only order from suppliers that do not use styrofoam packaging
- Before buying new equipment and shipping it to your lab, use UTransfer to check to see if anyone on campus has what you need
- Investigate solid state lighting
  - Consider installing solid state lighting for microscopes
  - Replace gas lasers with solid state lasers when possible