JOHNS HOPKINS UNIVERSITY | Sustainability

GREEN LABS

BEST PRACTICES

A short guide to making your lab a greener, more environmentally-friendly space.

For links, refer to the web version of the guide here:

CONTENTS

FUME HOODS

Did you know that if left open, one fume hood in a laboratory can use approximately three times more energy than a single household in a year?

To reduce this impact:

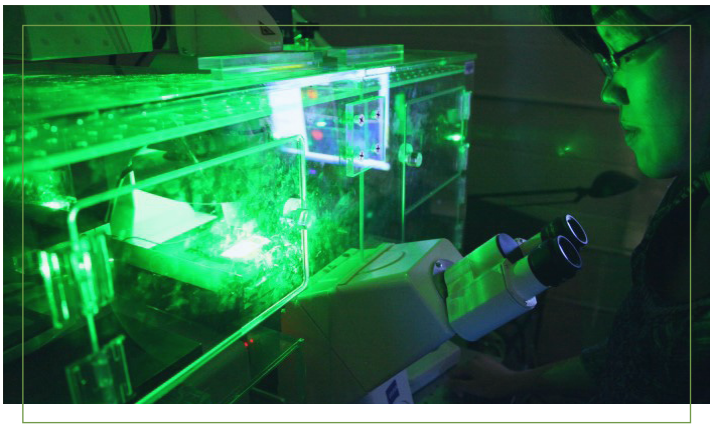
- Close the sash when not in use.
- Consolidate chemicals and avoid using fume hoods as storage cabinets.
- Do not block back air flow.
- Consider upgrading to new multiple-stash configuration fume hoods.
- Share fume hood space in order to decrease the number of fume hoods that need to be operating at the same time.
- Contact the Department of Health, Safety, and the Environment if you have any issues with your fume hood alarm.

INFRASTRUCTURE

Improving the efficiency of your building's infrastructure can save energy and lower your environmental impact.

To reduce infrastructure energy consumption:

- Contact building management or maintenance if you have any facilities problems. The contact list is available here.
- Avoid blocking thermostats and occupancy sensors with equipment, lab coats, or materials storage.
- Open or close window shades to reduce lighting usage.
- Keep operable windows closed to maximize heating or cooling efficiency and minimize waste.

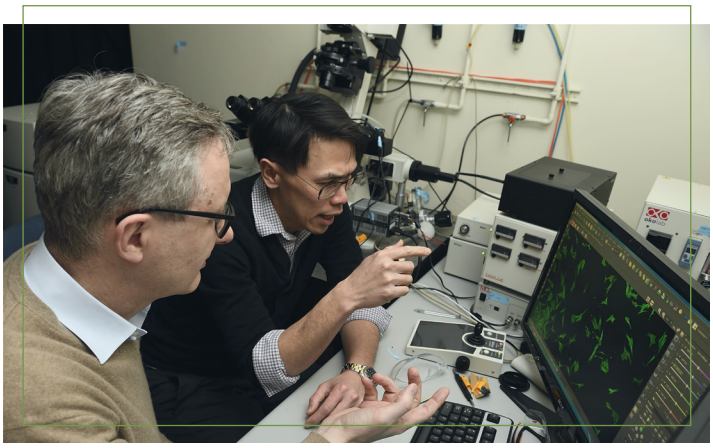


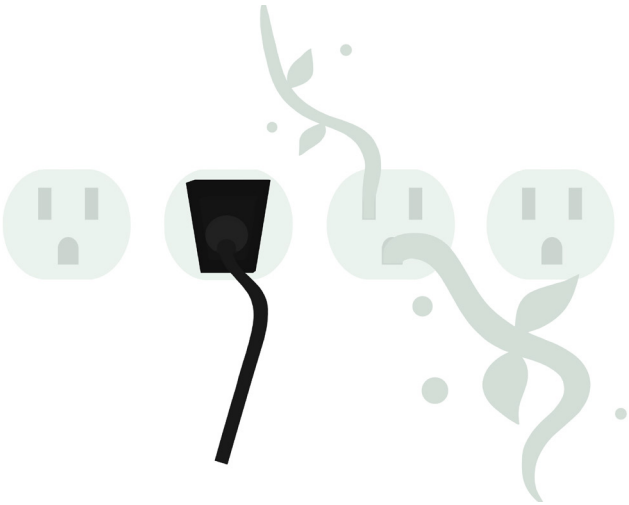
EQUIPMENT PLUG LOAD

Equipment plug load is responsible for approximately half of a research building's electrical consumption.

To maximize sustainability:

- Turn off equipment when not in use.
- Use outlet timers to automatically power on and off equipment.
- Share equipment with other labs or core facilities rather than purchasing and powering your own.
- Turn off screen savers and use energy saver modes such as sleep or standby on computers and large equipment.
- Replace energy-intensive equipment with more energy-efficient models.
- Before purchasing new equipment, see if it is available for use at one of JHU's many core facilities.





GREEN CHEMISTRY

Green chemistry, also known as sustainable chemistry, uses chemical products and processes that reduce or eliminate the use of hazardous substances in order to decrease the need to devote time, money, and energy to hazardous waste processing.

The 12 Principles of Green Chemistry can be found here.

In summary:

- Use an alternative to ethidium bromide for nucleic acid detection.
- Use an alternative to radioisotope labeling.
- Identify ways to run reactions at ambient temperature and pressure without heating or cooling.
- Test reactions on a small scale before scaling up to ensure reagents are not wasted. Likewise, do not run more larger-scale reactions than are vital.
- Avoid single pass cooling, and choose to utilize waterless condensers instead.

ULTRA-LOW TEMPERATURE FREEZERS

Ultra-low temperature (ULT) freezers are energy-intensive lab equipment.

The most sustainable practices are to:

- Perform regular freezer maintenance:
  - Clean the air filter to remove dust and grime.
  - De-ice the freezer: Scrape ice from around the door and rubber gasket and perform a total thaw of the unit.
- Keep freezers 8 inches away from the wall and 5 inches away from each other, and do not store items on top of them.
- Keep a paper or digital inventory of your samples to ensure you always know where your samples are and how many you have. Use rack, box, and sample labels to stay organized.
- Increase the temperature of your ULT freezer. -70° C has been proven safe for most if not all samples. Increasing the temperature of your freezer can save electricity and also prolong the life of your compressor.
- Ensure you have a comprehensive backup plan should your freezer fail. If you can keep a backup freezer, set it to -40°C to -60°C. You can also check with your department to see if they can loan a backup freezer. If not, companies such as Diversified Laboratory Repair (DLR) can bring you a prechilled rental freezer.

BIOSAFETY CABINETS

Biosafety cabinets can also be resource and energy intensive pieces of laboratory equipment in your workspace.

To reduce their impacts:

- Keep the air flowing by avoiding blocking front or rear air vents.
  - Consider going vertical for storage space. Clean, sterile racks placed inside the hood can provide more in-hood storage while avoiding blocking air vents.
  - Keep out all unnecessary items.
- Ensure sterility by disinfecting with appropriate chemical disinfectant (such as 70% ethanol) before and after use, making sure to spray and wipe all surfaces.
- Use UV for 30-60 min after using the BSC and keep the sash closed when not in use to maintain sterile surfaces.
- Avoid clogging your vacuum by ensuring you have a filter and overflow container separating your waste container from the vacuum. Be sure to rinse lines with 10% bleach solution and water to ensure you do not need to dispose of contaminated lines.
- Do not use open flames and volatile or dangerous chemicals in your BSC. Open flames can disrupt airflow and cause damage to the HEPA filters while harsh chemicals can damage HEPA filters and working surfaces of the BSC.
- Ensure your BSC is certified annually. If it is not, contact Biosafety within JHU HSE.

WASTE REDUCTION

Each school offers a variety of options for waste reduction in labs. For general guidance, check out campus initiatives.

All recyclables must be free of contamination, reagents, and solvents if recycled. Labels on bottles of chemicals and reagents should be removed if possible and nonremovable labels should be defaced with marker to indicate that they are clean and then placed in proper bins. See HSE guidance on recyclables. At all schools, recycling is not allowed for materials from any BSL3/ABSL3 laboratories or vivaria.

Best practices are:

- Recycle all office paper products, cardboard, and clean #1 and #2 plastic bottles.

Homewood:

- Recycle Kimberly Clark and Halyard nitrile gloves in designated RightCycle boxes from approved labs*.
- Recycle empty pipette tip boxes and inserts in designated boxes*.
- Have electronic lab waste collected after it has been certified as decontaminated by HSE by making a request with JHU recycling.

School of Public Health:

- Have electronic lab waste collected after it has been certified as decontaminated by HSE by sending an email to jhsph.maxhelp1@jhu.edu or calling 410-955-FSR! (3771)

School of Medicine:

- Recycle empty pipette tip boxes and inserts in designated bins*.
- Have electronic lab waste collected after it has been certified as decontaminated by HSE by submitting a request through the work order system.

*Contact sustainability@jhu.edu to participate in specialty recycling programs.

Want to learn more about how you can make your lab a greener space?

Visit the Green Labs page on our website for more ways to contribute to the green labs movement.

Contact the Green Labs Specialist if you have any questions, at: sustainability@jhu.edu