

MIT Green Lab Assessment

Welcome to the Green Lab Assessment! The purpose of this assessment tool is to reward you and your lab for the safe, sustainable lab practices you have already implemented, and to encourage you to explore new ways to reduce the environmental impact of your lab.

This assessment was created as a collaborative effort among UCD, UCSB, UCSC, UCSF, UCLA and the non-profit organization My Green Lab. If you have any questions, or any suggestions, please leave them in the comments section on the survey or [contact EHS](#).

Feel free to save the survey at any point and come back to it at a later date (clicking the next or done button will save your responses on any given page).

Thank you for taking the time to complete the assessment. To begin, please tell us about your lab:

* 1. Laboratory Information

Name:

PI Name:

Building:

Department:

Institution:

Email Address:

Phone Number:

Electricity

Laboratories consume nearly 5x more energy than a typical office space, and are often the largest consumers of energy on any given campus or at any given institution.

How efficiently is your lab running? Answer the questions below to find out.

1. Which of the following strategies for energy conservation do you use in your lab? (please check all that apply)

- We have posted green lab procedures including stickers for fume hoods, turning off lights, etc.
- We have labeled instruments with a start-up/shut-down procedure
- We have checked for and are aware of energy saving modes on all pieces of equipment
- We turn off chilled centrifuges, ovens, heating blocks and other equipment when not in use
- We have made durable signs about turning equipment off
- We have power strips that are easily accessible and in use
- We do not use screen savers - all of our computer monitors go into power-saving mode
- We only use LCD flat screens, no CRT computer monitors
- We measure the power consumption of our equipment and we are aware of how to save energy

2. We use and maintain outlet timers to avoid keeping equipment on all night.

- Always Frequently Never I don't know N/A

3. We purchase equipment with right size, water-saving, energy-saving, or material-saving features.

- Always Frequently Never I don't know N/A

4. When purchasing equipment, we consider appropriate size for the needs of the lab. This is especially relevant for autoclaves, ovens, and cold storage.

- Always Frequently Never I don't know N/A

5. We ask for Energy Star appliances and instrumentation, and, with the help of our Sustainability Office, we look for rebates before purchasing capital equipment.

- Always Frequently Never I don't know N/A

6. If an environmental room or incubator is unused, we return it off (after checking with others).

Always Frequently Never I don't know N/A

7. We keep windows closed when air conditioning is on.

Always Frequently Never I don't know N/A

8. Please discuss any barriers to implementing the energy efficiency measures above.

Lighting

There are many opportunities to reduce the amount of light that is used in your lab, and in some cases reducing or changing the type of lighting you use can have a significant impact.

Answer the questions below to find out if your lab has been bright about lights.

1. We turn off overhead lights when daylight is adequate, and we turn off the lights when we leave.

Always Frequently Never I don't know N/A

2. If more than one light switch is in a panel, we have marked the switches to indicate their function.

Always Frequently Never I don't know N/A

3. We use only the amount of light that is needed for the task at hand. For example, we use task lamp instead of overhead lights.

Always Frequently Never I don't know N/A

4. We ensure that lights are turned off in sporadically used rooms, such as storage rooms, cold rooms, and microscopy rooms.

Always Frequently Never I don't know N/A

5. We identify overhead fluorescent lamps that may be removed, and leave hall lights off if standby lights are adequate. We coordinate with the building manager to do this.

Always Frequently Never I don't know N/A

6. We switch to LED or other efficient solid state light bulbs when a bulb needs replacing. Incandescent, fluorescent, mercury, and metal halide bulbs use more energy than LEDs.

Always Frequently Never I don't know N/A

7. We have replaced gas lasers (Argon, HeNe) with solid state lasers when possible.

Always Frequently Never I don't know N/A

8. Please discuss any barriers to implementing the lighting efficiency measures above.

* 1. We use cold storage (refrigerators, freezers) in our lab.

Yes No

Cold Storage

If you work in a lab that uses cold storage (e.g. refrigerators or freezers) you are undoubtedly already keenly aware that these types of equipment consume a significant amount of energy. But did you know that a standard -80 freezer can consume nearly as much energy as a house every day? Make sure you are doing the most to save energy and prolong the life of your equipment by answering the questions below.

1. Cold storage uses a significant amount of energy. Which of the following strategies do you use to save energy (please check all that apply)?

- We maintain door seals to our freezers and we have posted the freezer maintenance policy
- We have joined the National Freezer Challenge (started at UC Davis)
- We have created a spreadsheet or database of valuable frozen samples
- We share ultra-low temperature freezer space with a colleague
- We have described 4 components of the StoreSmart program to our lab
- We do not use incubators as refrigerators; if incubators are not in use, we have shut them down
- We have nominated a Cold Storage Coordinator for our lab
- We have stored our ultra-low temperature freezers in rows close to the exhaust

2. We defrost the inside and vacuum the outside of refrigerators and freezer coils annually or biannually.

- Always Frequently Never I don't know N/A

3. We have chilled up our ultra-low temperature freezers. Points given for >10°C adjustment.

- All of our freezers have been chilled up
- Some of our freezers have been chilled up
- None of our freezers have been chilled up

4. We use room temperature sample storage for archived DNA, RNA, or for shipping without dry ice.

- All possible samples are stored at room temperature
- Some possible samples are stored at room temperature
- None of our addressable samples are stored at room temperature

5. We eliminate old and low priority samples from our standing and walk-in freezers.

Always Frequently Never I don't know N/A

6. We recycle old refrigerators in favor of Energy Star; we recycle old freezers in favor of more energy efficient ones.

Always Frequently Never I don't know N/A

7. We use appropriately sized containers for ice, dry ice, and liquid nitrogen.

Always Frequently Never I don't know N/A

8. Please discuss any barriers to implementing the cold storage measures above.

* 1. Our lab uses fume hoods and tissue culture hoods.

Yes No

Ventilation

Laboratories have very strict air flow requirements that you may have never considered before. For example, it is not uncommon for the air in a lab to be exchanged 10 or 20 times per hour. As you might imagine, this results in a tremendous amount of energy consumption. In fact, ventilation systems have been shown to account for nearly half of all energy used in a lab. As an example, a chemical fume hood uses, on average, as much energy as 3.5 households every day. Find out if you are doing the most you can to reduce energy consumption due to ventilation by answering the questions below.

1. Correct usage of fume hoods and ventilation:

- We always close fume hood sashes
- We have posted a sticker on the fume hood as a reminder to shut the sash
- We never store chemicals in fume hoods
- We do not evaporate solvents in fume hoods or in the open lab; we close open containers even if they are in the hood
- We do not put too many appliances in one lab and the thermostats in our lab are free and unblocked

2. We turn off our tissue culture hood completely when it is not in use. We use UV lights for 30 minute sterilization if necessary.

- Always Frequently Never I don't know N/A

3. Our hallway doors are kept closed to allow for room ventilation to run as designed, i.e. with slight negative pressure in the lab.

- Always Frequently Never I don't know N/A

4. If our fume hood is not in use, we have contacted EHS to have it decommissioned.

- Yes No I don't know N/A

5. Please discuss any barriers to implementing the ventilation efficiency measures above.

Water Consumption

Water is a precious resource that is often used inefficiently in labs. Are you following best practice for water consumption?

1. We turn off the tap when it is not in use.

Always Frequently Never I don't know N/A

2. We have posted signs to report leaks.

Yes No

3. Our faucets have low-flow aerators, and they have been checked by the building manager for proper function. Low-flow aerators are less than 2.0gpm

All of our faucets have aerators Some of our faucets have aerators None of our faucets have aerators

I don't know if our faucets have aerators We don't have faucets

4. We use timers for water valves to set minimum necessary time.

Always Frequently Never I don't know N/A

5. We replaced vacuum aspirators with membrane/diaphragm/oil-free pumps.

Always Frequently Never I don't know N/A

6. We use ice makers efficiently.

Always Frequently Never I don't know N/A

7. We look for and report leaks at icemaker and autoclave drains.

Always Frequently Never I don't know N/A

8. Please discuss any barriers to implementing the water efficiency measures above.

* 1. Our laboratory uses autoclaves or sterilizers

Yes No

Autoclaves and Sterilizers

Autoclaves and sterilizers can use several hundred gallons of water every day. Answer the questions below to find out if you are doing your best to conserve water.

1. We have established efficient labware washing practices. If we use autoclaves, we run the autoclave at full capacity and put it into standby mode when it is not in use.

Always Frequently Never I don't know N/A

2. We have installed Water Mizers (or a similar water-saving product) on sterilizers and autoclaves.

- All sterilizers and autoclaves have Water Mizers
- Some sterilizers and autoclaves have Water Mizers
- None of our sterilizers or autoclaves have Water Mizers
- I don't know if our sterilizers and autoclaves have Water Mizers

3. We have reduced/eliminated single pass cooling and switched to closed-loop cooling wherever possible.

Yes No I don't know

4. Please discuss any barriers to implementing the measures above.

* 1. Our lab uses distilled or purified water systems.

Yes No

Distilled and Purified Water

You may be surprised to learn that the processes used to obtain distilled or deionized water are highly inefficient, both in terms of water use and energy consumption. It is not uncommon for these processes to consume more than twice the amount of water than they produce. Answer the questions below to find out if your lab is conserving its specialized water resources.

1. We use appropriate quality water for each task.

Always Frequently Never I don't know N/A

2. If adequate quality water can be obtained by DI or RO we do not use water stills. We are efficient with water stills if we use them.

Always Frequently Never I don't know N/A

3. We check the efficiency of DI/RO/purified water systems with help from the building manager.

Yes No

4. Please discuss any barriers to implementing the measures above.

Inventory Management

Good inventory management practices can lead to significant cost savings for the lab (avoiding duplicate purchases), and can significantly reduce the amount of waste produced by the lab (fewer out-of-date bottles discarded).

Find out if your lab can save money and resources with better inventory management by answering the questions below.

1. We maintain an inventory of supplies and equipment.

Yes No I don't know

2. Before purchasing new items, we check our own surplus inventory.

Always Frequently Never I don't know N/A

3. We share our surplus chemical inventory with other labs.

Yes No I don't know N/A

4. We order only the materials we expect to use. We avoid ordering more materials than we expect to use by keeping a good inventory and initiating periodic lab clean-ups.

Always Frequently Never

5. We consolidate purchases to reduce packaging waste; we eliminate small purchase orders below \$100.

Always Frequently Never I don't know N/A

6. We share equipment with colleagues or departmental listserves.

Always Frequently Never I don't know N/A

7. We donate usable items to a departmental "free shelf" and/or we contact reuse-request@mit.edu.

Always Frequently Never I don't know N/A

8. We have a checklist for researchers that is distributed when someone enters the lab and it is completed when someone leaves the group (e.g. freezer cleanout, inventory, and disposal of samples).

Yes No I don't know

9. We host an annual lab cleanup day. Contact EHS for assistance.

Yes No

10. When we ship samples, we ship them without dry ice whenever possible and we reuse shipping containers that are IATA approved. Contact EHS for assistance.

Always Frequently Never I don't know N/A

11. We keep a chemical inventory of short-lifespan chemicals and peroxide formers.

Yes No I don't know N/A

12. We purchase the minimum amount of solvent necessary; we do not buy solvents in bulk if we do not have an immediate need for them.

Always Frequently Never I don't know N/A

13. Please discuss any barriers to implementing the inventory management measures above.

Recycling

When was the last time you threw a plastic bottle or a soda can in the trash? It's likely been a while - chances are you recycle these items instead.

What about lab products? Do you throw those away, or do you recycle them? Or maybe you repurpose them? Answer the questions below to find out if you are doing the most you can to reduce your waste stream by recycling and repurposing the consumables in your lab.

1. We have set up recycling bins for plastic, glass, and metal. We have posted information about where to dispose of recycled materials and we have trained all lab members on how to recycle materials in the lab.

Yes No

2. We return foam peanuts to the storeroom or shipping store.

Always Frequently Never I don't know N/A

3. We organize a white foam pick up within the lab or within the department after accumulation.

Always Frequently Never I don't know N/A

4. We recycle and/or reuse cardboard.

Always Frequently Never I don't know N/A

5. We use recyclable plastics and/or plastics containing recycled materials.

Always Frequently Never I don't know N/A

6. We use compostable plastics whenever possible.

Always Frequently Never I don't know N/A

7. We use recyclable gloves and/or compostable gloves when possible.

Always Frequently Never I don't know N/A

8. We recycle unusable metal equipment and furniture. We redistribute unwanted equipment and furniture.

Always Frequently Never I don't know N/A

9. We purchase chlorine-free paper and recycled content paper. We keep track of how much paper we use.

Always Frequently Never I don't know N/A

10. We recycle and reuse paper. No page is left blank on either side.

Always Frequently Never I don't know N/A

11. We recycle ink and toner cartridges.

Always Frequently Never I don't know N/A

12. We recycle our rinsed chemical bottles.

Always Frequently Never I don't know N/A

13. We recycle our clean broken glassware when possible.

Always Frequently Never I don't know N/A

14. Please discuss any barriers to implementing the recycling measures above.

Waste Reduction

So much of what gets thrown away in labs can actually be diverted away from the landfill. Are you diverting waste from your lab? Answer the questions below to find out.

1. Waste Reduction

- We have identified 3-5 of the biggest, heaviest, or most valuable waste streams from our operation; we have researched alternative options to divert waste and have discussed these in lab meeting.
- We have diverted one of our top divertible waste streams from the landfill
- We offer composting if available in the building
- We have multifunctional printers that scan, fax, print, and copy in order to eliminate personal printers
- We have double-sided printing as the default for each public printer
- We have removed our names from vendor catalog mailing lists
- We reuse wire hangers for lab coats

2. We re-use disposable plastic and glass items, and we minimize the use of disposable items.

- Always Frequently Never I don't know N/A

3. We use glass pipettes and wash them using a Steris Pipette washing rack.

- Always Frequently Never I don't know N/A

4. We purchase products with reduced packaging or recycled packaging.

- Always Frequently Never I don't know N/A

5. We use shared office and lab supplies.

- Always Frequently Never I don't know N/A

6. We use vendor equipment buy-back programs.

- Always Frequently Never I don't know N/A

7. Please discuss any barriers to implementing the waste reduction measures above.

Regulated Waste

Regulated waste from the lab has the potential to damage the environment. Employing methods to minimize the use of hazardous materials, as well as taking the proper precautions when handling hazardous waste, will ensure that your lab makes a minimal impact on the environment.

More information about hazardous waste can be found on [EHS' website](#).

1. We purchase products with reduced toxicity and less hazardous chemicals.

- Always - every opportunity we get
 Often - we usually choose a less toxic version
 Never
 I don't know

2. We properly dispose of mercury and metal halide bulbs and CFLs.

- Always Frequently Never I don't know N/A

3. We have evaluated Red Bag waste practices if applicable. We ensure that Red Bag waste is separated from regular waste (which can go straight into the landfill).

- Always Frequently Never I don't know N/A

4. We avoid mixing hazardous waste with non-hazardous waste.

- Always Frequently Never I don't know N/A

5. We have a battery collection bin.

- Yes No I don't know N/A

6. We use the TechnoCycle and E-Waste programs in order to properly recycle our electronic waste.

- Always Frequently Never I don't know N/A

7. Please discuss any barriers to implementing the regulated waste measures above.

* 1. Our lab uses chemicals.

Yes No

Green Chemistry

Green chemistry is defined as "the invention, design, and application of chemical products and processes to reduce or eliminate the use and generation of hazardous substances" - icaweb.org

The questions listed below will help you identify if you are using safe, sustainable substitutes for several commonly used chemicals. You may be surprised to learn that many of these substitutes are not only better for the environment - they're also better for your wallet.

1. Minimizing Toxic Chemicals

- We have offered surplus chemicals in an email to our department colleagues in the last year
- We have posted the [12 Principles of Green Chemistry](#) and these have been discussed in lab meeting
- We have a lab-specific document containing information pertinent to our specific chemistry
- We avoid the use of [unprotected metallic lead](#)
- We have exchanged/purchased [spirit thermometers](#) to replace mercury thermometers
- We use oldest chemicals/reagents in a 'first in, first out' policy
- We have all of our chemicals and containers well-labeled with the contents and date of arrival; our chemicals are stored in approved and secure locations and disposed of properly
- We use computer simulations to plan and/or confirm experiments
- We have [consciously purchased products without](#) PVC, BPA, PBTs, or phthalates once in the past 6 months

2. We seek ways to [minimize chemical use](#). For example, we have considered or use microchemistry.

- Always Frequently Never I don't know

3. We avoid the use of [halogenated reagents](#).

- Always Frequently Never I don't know N/A

4. We avoid the use of mercury-based products.

- Always Frequently Never I don't know N/A

5. We use ethidium bromide [alternatives](#).

- Always Frequently Never I don't know N/A

6. We maintain and review our chemical inventory to prevent over-purchasing.

Always Frequently Never I don't know N/A

7. We collect waste oils and solvents for reuse. Contact EHS for assistance.

Always Frequently Never I don't know N/A

8. We have replaced hazardous chemicals with green or less hazardous chemicals. For more information see MIT's Green Alternatives Wizard.

Always Frequently Never I don't know

9. We use Green Seal cleaning products.

Always Frequently Never I don't know

10. We use hand soap without triclosan (often found in anti-bacterial soap).

Always Frequently Never I don't know

11. Please discuss any barriers to implementing the green chemistry measures above.

Travel

Does your lab travel smart? Find out by answering the questions below. For more information, visit MIT's Facilities Transportation [website](#).

1. We regularly carpool, ride our bikes, or take public transportation.

Always Frequently Never

2. We take public transportation or shuttle service to the airport for business travel.

Always Frequently Never

3. We only ship overnight or "rush" when absolutely necessary.

Always Frequently Never I don't know

4. We buy [carbon offsets](#) when feasible for business air travel.

Always Frequently Never I don't know N/A

5. We use teleconferencing or videoconferencing instead of flying to meet with other researchers.

Always Frequently Never

6. We use [alternative transportation](#) around campus.

Always Frequently Never N/A

7. We have posted information on alternative transportation.

Yes No

8. Please discuss any barriers to implementing the travel measures above.

* 1. Our lab does field work.

Yes No

Field Work

Field work requires a unique sensitivity to the environment; preserving the field site is of tantamount importance to the research. Is your lab following best practice in the field? Find out by answering the questions below.

Contact EHS for assistance with field work planning.

1. We use reusable or recyclable staking/flagging material.

Always Frequently Never I don't know N/A

2. We account for and recover all staking/flagging materials and all batteries and electronics deployed in the field.

Always Frequently Never I don't know N/A

3. We use reusable or recyclable small containers.

Always Frequently Never I don't know N/A

4. We use reusable batteries whenever possible.

Always Frequently Never I don't know N/A

5. We use only sterile sample containers when necessary, and only autoclave when necessary.

Always Frequently Never I don't know N/A

6. We use electronic data collection instead of paper.

Always Frequently Never

7. We reduce water use by using water-conserving technology (e.g. drip hoses) and watering at appropriate times during the day.

Always Frequently Never I don't know N/A

8. We reduce our travel footprint by eliminating unnecessary travel, carpooling, and purchasing carbon offsets.

Always Frequently Never

9. We have a protocol in place to ensure we don't leave a trace after lab research activities.

Always Frequently Never

10. Please discuss any barriers to implementing the field energy measures above.

Community

The concept of a sustainable lab reaches beyond the four walls of the lab itself - it extends into the community. A sustainable lab shares best practices with other labs in order to help more labs become 'green'. A sustainable lab also has a positive impact on the local community, engaging people outside of the scientific community with discussions about new scientific discoveries.

1. Community

- We have appointed a lab member as a champion or point person for sustainability
- We have established roles for each person in the lab related to sustainability tasks and these are written in a protocol
- We have started a Conservation Committee for the department or building
- We communicate our conservation techniques at team meetings
- We have established a method to collect feedback on sustainability-related issues in the workplace (e.g. google docs, discussion during lab meetings)
- We provide information on workplace-specific sustainability goals and guidelines for best practice and contact information in new hire information packets
- We advocate for green lab programs to our department, administration and facilities managers
- We participate in a department listserve that offers good communication across departments
- We have posted protocols/stickers with information about turning off common equipment
- We conduct green lab training for all personnel including new staff in the group
- We have developed cordial relationships with custodians, ventilation, and electrical maintenance staff
- We actively engage the local community in our research preparations, e.g. public meetings to talk about research, talk to elders in the community or representative organizations
- We have completed a lab equipment and lab practices survey

2. Please discuss any barriers to implementing the community measures above.

MIT Green Lab Assessment

1. Do you have the support of your PI?

Yes No

2. How many people are in your lab?

3. To participate in the contest, please explain how you plan to green your lab.

We'd like to hear your final thoughts about the survey.

* 1. Did you learn anything new from this assessment?

Yes No

* 2. The assessment tool was

Too long Too short Just right

* 3. Were the questions clear?

Yes No Somewhat

4. Is there any information you feel is missing?

* 5. Were the hyperlinks useful?

Very Somewhat A little
 Not at all

6. Do you have suggestions regarding the layout of the assessment tool?