



GREEN LABS AT EMORY GUIDANCE DOCUMENT

#	Item Description	Suggested Action	Justification
1.0	ENERGY AND WATER EFFICIENCY AND CONSERVATION In our lab, we . . .		
1.1	Turn off equipment when it is not in use.	Utilize signage to encourage this practice. Some signage will be included in your Green Lab Certification Packet. You may request more equipment reminder clings from the Green Lab Team .	The energy used by lab plug load accounts for 22% of lab energy use and is the easiest category on which we can have an impact.
1.2	Unplug all lab equipment daily when it is not in use to reduce “vampire” loads (stir plates, vortexes, etc.).	Utilize signage to encourage this practice. Some signage will be included in your Green Lab Certification Packet. You may request more equipment reminder clings from the Green Lab Team .	A vampire load is the amount of energy an appliance uses while in “standby” mode or while switched “off” and still plugged in (EfficiencyVermont). This decreases energy consumption, thereby decreasing both costs and carbon dioxide emissions.
1.3	Keep cooling equipment full for maximum energy efficiency (refrigerators, freezers, dry ice coolers, etc.).	Notify other labs when freezer space is available. Reduce empty space by reusing ice packs and empty foam blocks from previous shipments. You can find these materials in stock rooms or your building’s recycling area.	A full freezer stays colder longer; it takes less energy to keep frozen items cold than to cool the air of empty space in a freezer.

1.4	Inventory refrigerator and freezer contents to minimize the time the door is open while accessing materials.	Labs may designate this responsibility to a particular lab member and post an inventory listing on the exterior of freezers with the location of specific items (<i>see Appendix A for sample freezer inventory</i>).	Every time a freezer is opened, it requires extra energy to bring the temperature back down again, and the longer it is left open, the more cold air is lost.
1.5	Retire empty refrigerators and freezers when not in use.	Communicate with other labs to consolidate or share freezer space so that an empty or near-empty freezer can be unplugged.	One -80°C freezer uses as much energy as a single-family home each year
1.6	Defrost freezers annually for maximum energy efficiency.	Refrigerators and freezers should be cleaned out and defrosted annually, and a record of defrost dates should be maintained.	Defrosting is necessary because the buildup of ice prevents heat from transferring out of refrigerators and freezers and increases running costs (LABRepCo - Learn How To Defrost A Laboratory Freezer).
1.7	Utilize the onsite Hamilton Biorepository in HSRB II to store samples.	The Emory Integrated Biorepository Core , one of the Emory Integrated Core Facilities , is supported by the Emory University School of Medicine. They provide investigators with storage, tracking, and retrieval of biospecimens necessary for their research goals.	Ultra-low freezers use a lot of energy and emit a lot of heat; putting them in a freezer farm makes them easier to monitor and regulate.
1.8	Adjust the set points of refrigerators and freezers to the highest possible temperature for the samples that are present, and store samples at appropriate temperatures.	Instead of defaulting to the lowest possible setting on your lab's cold storage equipment, raise the temperature to the lowest set point needed for your type of samples.	Ultra-low temperature freezers set to -70°C instead of -80°C uses up to 40% less energy (The Freezer Challenge). One -80°C freezer uses as much energy as a single-family home each year Many samples and reagents don't need to be stored at -80°C. For example, store DNA in a standard -20°C freezer instead (The Freezer Challenge).

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1.9	Maintain equipment according to manufacturer instructions to optimize performance and efficiency. For example, freezer coils need to be cleaned/dusted 2-3 times per year to decrease energy consumption and increase longevity.	Labs may determine maintenance schedules based on their specific equipment. A clear and accessible record should be maintained. For example, freezer coils need to be cleaned/dusted 2-3 times per year to decrease energy consumption and increase longevity.	Following manufacturer recommendations will increase the lifespan of the equipment, prevent delays and inaccuracies in results, and ensure that the equipment performs at maximum efficiency.
1.10	Use cleaning equipment (dishwashers, autoclaves, etc.) only when full.	Labs may create a schedule for washing, autoclaving, and other cleaning duties and designate a lab member to ensure the schedule is followed.	Dishwashers and autoclaves use the same amount of water and energy whether they are empty or full, so waiting until they are full conserves these resources (Thermodynamic Realities of Medical-Grade Autoclaves).
1.11	Use task lighting rather than overhead artificial light whenever possible.	Take advantage of natural lighting whenever possible; turn off ambient lighting when task lighting is sufficient, and utilize signage to remind lab members to turn off lights. Light switch clings can be requested from the Green Lab Team .	Lighting energy intensity in labs is up to twice that of a typical office space and accounts for 8% to 25% of total electricity use .
1.12	Turn lights off when not in use, including task lighting.	Take advantage of natural lighting whenever possible; turn off ambient lighting when task lighting is sufficient, and utilize signage to remind lab members to turn off lights. Light switch clings can be requested from the Green Lab Team . Note: Laboratories in 1462 Clifton Road, Rollins Research Center, and the Math / Science building must leave their room lights on when using the fume hood. Fume hoods in these buildings are set back when the lights are off.	Lighting energy intensity in labs is up to twice that of a typical office space and accounts for 8% to 25% of total electricity use .

1.13	Report any water leaks in pipes or sinks to Facilities Management.	Place signage above sinks with Facilities Management contact information. To request signage, contact the Green Labs Team .	A tap leaking at the rate of 1 drop per second can waste more than 3,000 gallons of water per year (US EPA - Fix a Leak Week).
1.14	Use water aspirators minimally.	Use vacuum systems in lieu of water aspirators.	A single water aspirator can consume and contaminate as much as 50,000 gallons of water in a year (Fisher Scientific - Examining the Costs and Environmental Impact of Water Aspirators).
1.15	Use tap water rather than deionized water whenever possible.	Deionized water only needs to be used as a final rinse when cleaning glassware. Initial cleaning can be done with tap water.	Unnecessarily utilizing deionized water increases energy consumption due to the power used during deionization. (Minimizing Environmental Impacts of Water Purification)
1.16	Lower the sash on the fume hood when not in use.	Educate lab members on how to properly use the fume hood and apply a reminder sticker to reduce the energy burden that fume hoods place on facility HVAC systems. Contact your EHSO building liaison if your chemical fume hood does not have a “lower your sash” sticker.	Keeping a fume hood open when not in use can waste \$1,500 per year in energy costs.
1.17	Post signage encouraging energy savings throughout the laboratory.	Request energy-savings signage from the Green Labs Team .	Signs (ex: stickers over light switches) serve as visual cues to remind us to incorporate energy saving behaviors in our day-to-day lives.
2.0	RECYCLING & WASTE REDUCTION In our lab, we .		
#	Item Description	Suggested Action	Justification
2.1	Make recycling bins available to the laboratory and ensure	To download Emory’s lab recycling and waste disposal protocol, click here or visit the Green Labs at Emory web page .	Emory’s recycling stream includes white paper, plastics and metals, all glass, mixed paper, and compost (Emory OSI- Recycling).

	nonhazardous, clean materials are recycled.	To request bins, labels, or if you are unsure whether or not an item can be recycled, email greenlabs@emory.edu .	<p>☐ <i>Pyrex glass cannot be recycled!</i></p> <p>Emory plans to divert 95% of campus waste from landfills. Read more about OSI's zero landfill waste goals and waste minimization.</p>
2.2	Print all materials double-sided and recycle printer cartridges in the Hard-to-Recycle station.	After hitting the "Print" button, go to the "Layout" tab under Print Settings. Click two-sided. You're good to go! Used printer cartridges can be recycled in Hard-to-Recycle stations.	Printing double-sided saves paper and ink consumption, thereby minimizing costs.
2.3	Reuse envelopes, boxes, ice packs, and packaging materials whenever possible.	Organize an area to maintain packaging materials suitable for redistributing or repurposing. For example, repurposing ice packs for use in empty spaces within cold storage equipment will help distribute the cold air within more evenly, and decrease the overall load on the system.	Approximately one-third of the material in an average landfill is packaging material (EPA- Municipal Solid Waste).
2.4	Use rechargeable batteries when possible. If single-use batteries are needed, they are recycled in the nearest Hard-to-Recycle station.	Learn more about proper battery recycling procedures on EHSO's Universal Waste Quick Facts . This site will also provide information on how to dispose of lamps, pesticides, and mercury-containing articles.	Batteries contain a number of heavy metals and toxic chemicals that can contaminate the soil and pollute waterways (Bernardes et al.- Recycling of Batteries: a review of current processes and technologies).
2.5	Replace aerosols with non-aerosol alternatives when possible. If aerosols are necessary, they are recycled in the nearest Hard-to-Recycle Station.	All aerosol cans, whether full or empty, need to be recycled in the nearest Hard-to-Recycle Station . For larger pickups, contact EHSO for disposal as chemical waste (Guidelines for Regulated Waste Disposal). Submit EHSO waste pickup requests to chemwaste@emory.edu .	Aerosol cans can present a unique hazard in that the pressurization of the container is often more dangerous than the compound within (Guidelines for Managing Used Aerosols).

2.6	Redistribute unused chemicals within the building through Quartz, FindMolecule, or other tools.	Follow EHSO's chemical disposal guidelines when disposing of chemicals (EHSO Waste Page). Quartz is an online resource that labs can use and easily inventory samples/materials. These inventories can easily be shared with other labs within your department to make material sharing more accessible.	Unused chemicals may constitute 40% or more of the hazardous waste stream generated in laboratories that have not emphasized waste minimization (ACS- Less is Better).
2.7	Offer redundant or non-used equipment to surplus for re-use by another lab or to recycle.	If you have old equipment in your lab that you no longer use and are looking to sell, Campus Services Surplus and Staging can help. First, make sure the equipment still has value; this doesn't apply to decommissioned items. If your item is eligible, place a work order through this link .	Donating equipment reduces surplus equipment, supplies, and costs (Harvard- New Life for Lab Equipment).
3.0	CHEMICALS In our lab, we . . .		
#	Item Description	Suggested Action	Justification
3.1	Find alternative solutions to radioactive materials when possible.	MIT's Green Chemical Alternatives Purchasing Wizard provides information on alternatives to hazardous chemicals or processes.	Radioactive materials accrue additional costs such as disposal, contamination surveying, and special training (NCBI- The Impact of Low Level Radioactive Waste Management Policy on Biomedical Research in the United States).
3.2	Utilize green chemistry methods, including computer simulations and micro-scale chemistry	MIT's Green Chemical Alternatives Purchasing Wizard provides information on alternatives to hazardous chemicals or processes. The EPA provides 12 principles for green chemistry .	Green chemistry consists of chemical products and processes that reduce or eliminate the use or generation of hazardous substances.

	techniques when applicable.		
3.4	Substitute mercury-containing equipment with other alternatives when possible.	Try using alcohol-based thermometers instead of mercury thermometers. Work with equipment suppliers to see if non-mercury-containing equipment is available. Mercury-containing equipment (including thermometers) must be disposed of through EHSO. A waste pickup request should be submitted to chemwaste@emory.edu .	Mercury is a toxic and volatile chemical that produces indoor air contamination when leaked or spilled (NIH- Mercury Hazard Reduction Campaign).
4.0	PROCUREMENT In our lab, we . . .		
#	Item Description	Suggested Action	Justification
4.1	Purchase products made from recycled materials whenever possible.	Look for items designated as being made of recycled materials by vendors.	Purchasing recycled products reduces landfill waste, conserves natural resources and energy, and promotes the market for recycled products (EPA- Waste Wise Tip Sheet).
4.2	Prioritize purchasing Energy Star equipment.	Look for Energy Star designation on vendor websites.	Energy Star products are part of a U.S. EPA program that helps businesses and individuals save money and reduce energy consumption through purchasing high-energy efficiency products (Energy Star).
4.3	Utilize previously purchased materials and stock solutions before purchasing new materials (micro-scaling).	When possible, reduce chemical use to the lowest level at which experiments can be effectively performed.	Micro-scaling reduces chemical use, improves lab safety, saves money, and reduces experiment time (Microscale Chemistry and Green Chemistry: Complementary Pedagogies).

4.4	Make bulk orders for materials that won't expire.	Consider volume ordering for materials that won't expire.	Bulk ordering requires fewer transport deliveries, meaning fewer transport emissions. Bulk sizes can also reduce required packaging.
4.5	Request take-back programs from suppliers (i.e., ice packs, foam coolers, and packaging waste) and reduce these single-use items when possible.	Request information from vendors for details of available take-back programs.	Take-back programs can be used for surplus supplies, Styrofoam coolers, ink & toner cartridges , and/or packaging materials.
4.6	Borrow and share equipment with other researchers before purchasing new.	Work on reusing equipment instead of disposing.	The most effective way to reduce waste is to not create it in the first place . Making a new product emits greenhouse gases that contribute to climate change and requires a lot of materials and energy.
4.7	Prioritize purchasing equipment with the ACT Environmental Impact Label.	Ensure purchased equipment is ACT certified.	The ACT Environmental Impact Label entails third-party verification of the sustainable impacts of a product, its operations, and its end of life.
5.0	ENGAGEMENT In our lab, we . . .		
#	Item Description	Suggested Action	Justification
5.1	Inform and ask lab members to agree to follow the applicable actions on this checklist.		We recommend acquiring agreement from at least 75% of lab members for maximum success.
5.2	Share information about our Green Lab certification with all new employees and encourage them to get involved.		

5.3	Discuss sustainability and the progress of our Green Lab certification at lab meetings.		Studies show that the best way to encourage sustainable action is through peer-to-peer communication .
5.4	Have at least one lab representative on the Office of Sustainability Initiatives e-mail list serv , and redistribute relevant information to lab members.	Please sign up for the OSI listserv here .	The weekly newsletter provides information on the Lab Freezer Challenge, Incentives Fund, and other programs related to Green Labs.
5.5	Know who our building's Sustainability Representative is and communicate with them about any related inquiries and ideas.	Find your building's Sustainability Representative here .	
5.6	Promote and provide resources for sustainable transportation options, such as public transit, biking, carpooling, etc.	For information on available commute alternatives, visit the Transportation and Parking Services website here .	11% of Emory's CO2 emissions come from faculty, staff, and student commuting. Choosing an alternative helps Emory reach its goal of a 50% GHG emissions reduction by 2030 from a 2010 baseline. For more information, look at our 2023 Greenhouse Gas Emissions Inventory .
5.7	Have at least 50% of our lab staff participating in Emory's Sustainability Pledge.		Locate and take or renew your Sustainability Pledge here .
5.8	Review the Plastic Free Emory Project's fact sheet and pledge.		Locate information about Plastic Free Emory here .

5.9	Recommend at least one other lab to apply for the Green Labs Certification Program.	The link to the email template can be found here . Please be sure to copy greenlabs@emory.edu in your email.	Studies show that the best way to encourage sustainable action is through peer-to-peer communication .
7.0	<p>INNOVATION In our lab, we . . . Please focus on innovations relating to reducing single-use plastics, reducing packaging waste of ice packs and foam coolers, and sharing equipment, in addition to any other sustainable practices you have made in your lab.</p>		
#	Item Description	Suggested Action	Justification
7.1	Encourage innovative ideas from our employees regarding lab-wide sustainability initiatives. Please provide some examples in the “Comments” section.	Labs can earn additional points for actions that are not listed in the checklist. Initiatives and corresponding points awarded are subject to committee approval.	
7.2	Apply to be a My Green Lab Ambassador or complete a module for the My Green Lab Accredited Professional Course .	Enroll in the My Green Lab Ambassador program or take a Green Lab Accredited Professional Course (this does cost money, which can be paid for through an Incentives Fund grant). Completing all modules will earn you My Green Lab AP accreditation.	The My Green Lab Ambassador Program is designed for scientists and laboratory professionals who are motivated to encourage their lab to be more sustainable. This free, online learning program will provide you with a quick introduction to lab sustainability and ideas for how sustainable actions can be implemented at your organization.
7.3	What are some examples of ways you encourage your lab members to come up with sustainable innovation?		This allows us to see ways in which you encourage sustainable thinking in the lab space.
7.4	What are some other sustainable implementations in your lab that are not in this Checklist?		This allows us to see innovation projects your lab is implementing, and provides us with new ideas on improving the current Green Labs checklist.

Appendix A- Freezer Inventory Template

Sample Name	Owner	Date	Freezer Name	Shelf	Rack	Box	Space in Box

