

240112 Meeting Minutes

Attendees: Vijaya Kimar, Eva Kercmar, James Linton, Jaasiel Alvarez, Kate Malecek, Ben Ben, Tasha Cammidge, Henry P, Giada Spigolon, Tatiana Solovieva, Yvette Garcia-Flores, Cathryn Holmes

This month, we are ordering treats from [Ginger Market \(catering menu\)](#) in Pasadena for this Friday's meeting! In your RSVP, please input which type of each kind of treat (cookies or bars) and drink (coffee, tea, hot chocolate, iced tea, or lemonade) you would prefer once the votes are in. **The deadline for submitting your order is Thursday 9am.** I can also bring a kettle so we can boil hot water and I will bring some yummy hot chocolate packets and tea bags for folks to enjoy! If you prefer, BYOT. **For bonus sustainability:** folks can bring their own cups and/or utensils and/or plates as an alternative to our usual compostable ones!

- Note: catering needs to be ordered 24h in advance, DO NOT USE EMAIL.
 - o Have a service where you can get lemonade etc in a returnable container (with a ladel!)
 - But SUPER HEAVY and does not come with a lid...?!?!
- Will update [Restaurant Guide](#) (released in October) and our [Coffee, Breakfast, and Dessert Guide](#) (posted in December!)

Introductions ...

[Million Advocates for Sustainable Science](#) Petition

- International Institute for Sustainable Laboratories (I2SL) along with My Green Lab are petitioning to change funding granting agency policy to promote sustainable research
- By signing the letter you can help transform how science funding organizations set expectations for efficiency, resiliency, and sustainability in the way scientific research is conducted
- KM: suggested we could promote this in our newsletters, and post posters, could promote over Earth Month

Green Labs Monthly Tip:

2024 International [Freezer Challenge](#)! January 1 – July 1, 2024

- Labs compete to improve freezer efficiency, sample accessibility, reduced risks, cost-savings, and energy-savings for their lab's cold storage!
- Fun, free program
- Scored on different categories (like defrosting freezers or inventorying)
- Awards given at I2SL for the winners!
- Could provide internal prizes also?

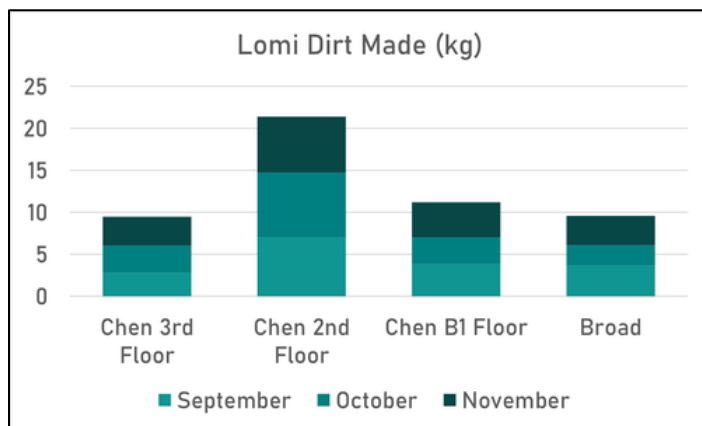
Updates!

- **14 Certified labs!! WHOOOOO**
 - o Please get CERTIFIED TODAY! To get certified, finish the easy, 30-minute [Green Labs Certification](#) and submit it to sustainability@caltech.edu.
 - o Certification event planned for Friday Dec. 15

- Sustainability Council update from TC on the Green Labs presentation last month
- Lots of media lately
 - o [California Tech Article “Caltech Orange Needs a Hint of Green”](#)
 - o [Caltech Weekly Article “Caltech on Path to Decarbonize”](#)
- We should use this energy from the campus to encourage sustainable practices!!

Updates – Pilot Programs

- Lomi program
 - o First [pilot program](#)
 - o Bjorkman Lab added another in Broad!
 - o Vera Beilinson in Alles/Kerkhoff joining?
 - o Chen has 3 (one on each floor)
 - o 92.5 gallons of dirt (350 L) from 462.5 gallons food waste (1750 L)!
 - o Leaderboard
 - (Chen 2nd floor)
 - o [Composting Challenge](#)
 - [Leaderboard now on our events](#) page! Chen 2nd floor is winning!



- Tip box and wafer recycling program (VK)
 - o Vijaya Kumar (project leader)
 - o NEW REP ERIK LAWSON from Genesee
 - o Trinity Dorger from USA Scientific
 - o 1500 gallons of plastic (770+ pounds!)
 - o Goal is to eventually collect data to show to BBE and get them to pay for better recycling program large-scale
- -70/-80 comparison project (JL giving update!)
 - o More information below meeting minutes for those interested
 - o [Call for samples posted](#), brought additional signs if anyone wants to take them back to their spaces
 - o To date, 5 labs have participated

- JL: did one test after one week, will do one at 6 months, and another after 1 year then do the data comparison
- Collaboration with NIH!!!!
- JL update: Energy-Efficient Strategies For Preserving Biological Material (slides posted on our [Drive](#) under Meeting Minutes -> [Project Presentations](#))
 - Laboratories use a lot of energy (296 kWh/day)
 - Reducing ULT Freezer Settings Could Save 522 kWh/year
 - -70°C vs -80°C: Does It Matter For Biological Material Integrity?
 - Short Term Archival of HEK 293 cells - no difference
 - Short and Mid Term Archival of *E.coli* - no difference
 - Short and Mid Term Potency of Protein - no difference
 - Short Term Cell Archival Is Equivalent At - 70 °C vs -80 °C Compared To -20 °C
 - Cell Mass = f(Effective Cell No. at t0)
 - Short And Mid Term Archival Of *E.coli* Is Equivalent At - 70 °C vs -80 °C Compared to -20 °C
 - The Potency of BMP-4 Can Be Assessed In A Cell Biological Assay
 - Potency Of BMP-4 Protein Is Equivalent When Stored At - 70 °C vs -80 °C
 -
- Grenova update – Kate Malecek and Jaasiel Alvarez
 - Went to Kaiser to see a machine in person, got lots of insights on how to make our own program
 - Their program is pretty integrated with a barcode system that already exists for their machines, but we will be building ours from the ground up
 - The Grenova tracks how many washes it has done so we can have accountability and provide ROIs to labs
 - Should know in the next few weeks about the grant application (may need a new quote but hopefully Grenova will honour our old one!)
- [Sustainable Restaurant Guide available online](#)
- [Sustainable Coffee, Breakfast, and Dessert Restaurant Guide!](#)
 - Attached to email, please give feedback and TC will post sometime next week to the website
- Action Plan for 2024
 - Presenting to the Lab Managers in March!
 - CCE and BBE Newsletters
 - Lab Cleanup Event
 - January – April
 - Lightning Talks in April?
 - Green Labs Certification push
 - January – April
 - Pilot projects...
 - More on this later
 - Anything else?

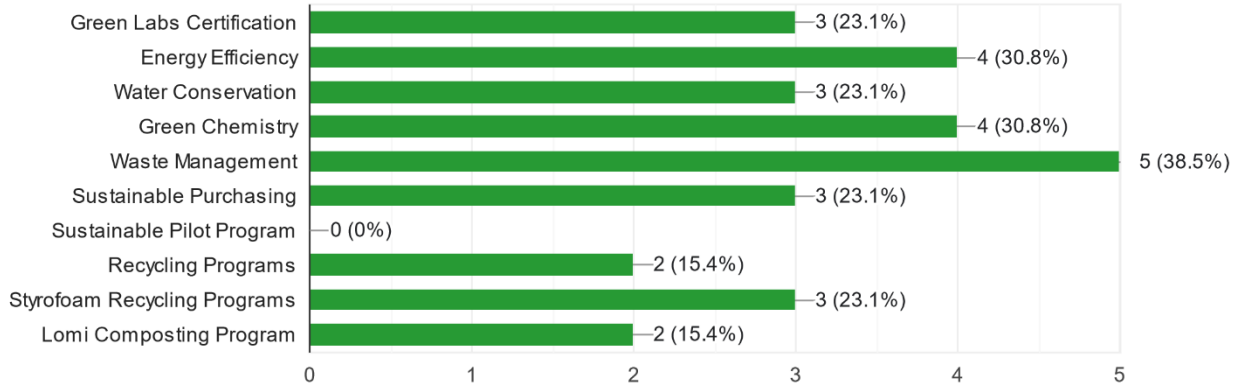
- Lab Cleanup Event
 - List of chores for labs to use
 - Resources available like magnets for freezer cleanout or inventory google sheets
 - Each participating lab will provide pictures of their cleanup by midnight April 30 to be eligible for lunch in May
 - Prizes will be given for biggest before and after difference, and for the “weirdest thing found”
 - Labs can also submit the “weirdest thing found” pictures for a prize
 - Sponsors for the event? USA Sci?
 - Lunch will be pizza (all vegetarian options!)
 - [Spreadsheet for glassware, equipment, and chemical share](#)
 - Digital space only (BBE can't give us space)
 - Collaborating with Jesse Flores to supply student labs
 - Send supplies to [LEAP program](#)
 - Signage and magnet designs below!
 - Resources
 - (These resources are in the email, please check them out and let TC know any feedback)
 - Freezer cleanout signage
 - “Stickers” or signs that promote the freezer challenge or participation in GL freezer stuff
 - “5 ways tips and tricks for keeping a green freezer” signage
 - A simple laminated sign (magnet?) that can be updated when the last cleanout was done or something like that
 - Website
 - Tons of information, just posted so please check it for errors, and feel free to email me to add stuff!
 - Categories organized into
 - Chore suggestions/how-to
 - Waste disposal
 - Inventories and signage
 - Let TC know any feedback or amendments!
 - JA: put a button for folks to use to RSVP and submit pictures on website
 - JA: put a “how to participate” tab in to show folks how easy it is to participate
 - (TC: add in Styrofoam project to this page once the program is up and running)
- Choose our own adventure
 - Pilot programs 2024 (folks wanted this one, see below)
 - Updating Guide 2024
-

Pilot programs 2024

- Feedback: Most folks interested in waste management, energy efficiency, and green chemistry

Please vote on a sustainable topic you would like to cover during our meetings or would like more information about.

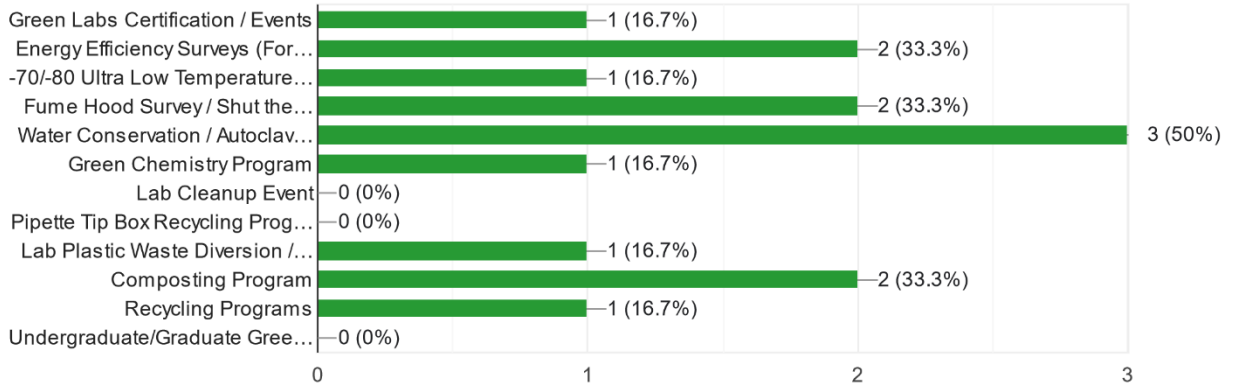
13 responses



- Feedback: Most folks interested in water conservation/autoclave share program, energy efficiency, fume hood surveys, composting programs

Are you interested in volunteering to help get one of the following sustainable programs off the ground? If so, please indicate below.

6 responses



- Make teams to target specific projects (topics expanded below)

- Smaller subgroups with a project leader or larger groups discussing (like it is now)
 - JA: Subgroups could break out each meeting (maybe in last 30 mins) to discuss projects, helpful to have one person who always goes or is "in charge", but cool to have smaller groups brainstorm and bring ideas
- Styrofoam

- JL: how to quantify the waste difficult, but if we can that makes it more tangible and harder for Caltech and researchers to ignore
- VK: In terms of what this project would look like: We have considered having collection points in the mail rooms of various buildings, and DW is willing to give us space to store a big 40' bin (TC will meet with him soon and will confirm again and try to set this up), need volunteers to transport the Styrofoam from each building, perhaps each building can have a volunteer to do this job? (YES!)
- TS: very visible, and addresses a huge need on our campus
- VK: can even run the pilot for a few months (until bin is full) just to collect data on useability, how often the bin will fill up etc, can see about getting volunteers licensed on the Caltech cars etc
 - TC: GL probably can provide funds for a month or two but can't support pickups (which are up to \$350 each) more than that, should be Caltech's responsibility
 - JL/KM ?: Could just leave the bin full after the pilot and use that as incentive (send a picture every month or so if Caltech is not supportive, ticking time bomb of waste...) (LOL) for Caltech to provide such a service permanently
- JA: social media can help with education here too, or can use it as a way to show how labs are doing with this project (send us your "Styrofoam pyramid" pictures!) or something
- JL: can we petition labs or vendors etc? Education?
 - TC: we actually made a petition and have asked vendors (VWR and Fisher – but they have not shown interest in running Styrofoam return programs through their stockrooms), can post this as a Google Form and start getting signatures, tie in education aspects etc
 - TC: added below the notes and have included here a link for the [Google Forms Styrofoam Petition](#)
 - TC: made a new folder in our [Drive](#) called "Styrofoam Project" with all the resources below also – please feel free to add feedback or update language or links!
- Fume hood inventory and shut the sash initiatives
- Autoclave inventory and autoclave share initiatives
- Green chemistry website landing page
- Social media
 - JA: willing to help with social medial sharing, has a background in sports but has handled that stuff before, work on TT, IG. IG reels, FB etc
 - JA: better way to engage and send reminders rather than just the email list, can send posters etc too
 -
- KM: Recertification program
 - KM: interested in seeing the old GL Certification submissions to see if there are areas we can address, or reach out to labs to see 1) if they are keeping up with it

- (get a sticker for their plaques) and 2) see if we can address something they had an issue with (and send them some resources to help address something)
- KM: opportunities to reassess their lab and maybe boost their standing?
 - KM: timeline?
 - TC: maybe April? Tie it into GLC event and Earth Day?
 - KM: want to re-engage with labs, especially those that don't come to meetings
- Expansion of current projects
- Composting
 - TS/GS: want to expand the composting project to their building (BI)
 - TC will contact them after meeting to set this up!
 - They will also look into if their labs can purchase a lomi or if GL will need to provide funds
 - TS/GS interested in even bringing over food waste to Chen to be composted in the interim – TC will see about this and give extra bins etc if needed
 - TC: is it mandatory to provide composting services?
 - TC: only for residences and apartments, businesses have to pay (which is why Caltech is not participating)
 - JL: issues sorting composting, so if we expand this project and do on-campus composting program there will need to be a lot of education
 - JA: social media can have a huge impact, use this as a tool for education
 - Pipette box/wafer recycling
 - -70° C comparison
 - Grenova project expansion
 - Chemical/equipment/glassware exchange program expansion and maintenance
- Other project ideas
- Green Labs Certificates for students
 - [One through UBC](#) that includes individually-driven coursework
 - Slide decks on sustainability in labs for lab meetings
 - Trainings in collaboration with EHS and Biosafety
 - Hard to reach Leyma et al, but trying
- Other suggestions?

For next time

- Certification
- Takes ½ hour
 - Very simple!
 - See <https://greenlabs.caltech.edu> for the form
 - Get a plaque!
 - Green Labs will give you bins and signage for your lab!
 - Only for Green Labs Certified labs

- Stickers
 - Can order stickers through us and we will print them and drop them off!
 - Three sizes (but fully customizable) and three colours/messages (1", 1.5", 2")
 - Help encourage behavioural changes
 - Recycling bins
 - "slim jim" style
-
- Photos!
- Work on Action Plan
- Anything Else?

Next Meeting February 9th 12pm-1:30pm Chen 240
Bring a friend and get a RocketBook!

Styrofoam Stuff:

Styrofoam commitment for vendors

Dear (vendor),

We are writing to you today to voice our support for transitioning shipping packaging from currently non-sustainable options, such as Polystyrene (Styrofoam) boxes or packing peanuts, to more [sustainable](#), [recyclable](#), or [compostable](#) options that are [just as effective](#) as Polystyrene.

Polystyrene has [massive effects on our planet](#) and [does not biodegrade](#). It is made from fossil fuels that are non-renewable and chemicals that can leach into and [contaminate our environment](#). Animals [ingest this material](#) and can be poisoned or killed. Polystyrene is considered a possible carcinogen by the [National Institutes of Health](#). This material is [not able to be recycled](#) in Pasadena and its sale and distribution has been [banned](#) in Pasadena as of [April, 2023](#).

We as scientists are acutely aware of [the negative impact](#) our research often has on the environment. By working towards a more sustainable future, and by asking for more sustainable resources for our

research, we are eager to add fuel to this proverbial fire to continue the success of our sustainable programs and initiatives.

Numerous vendors are choosing to adopt more sustainable practices and sustainable shipping packaging. We purchase products from you regularly and by making sustainability a priority, you will allow us to confidently source our laboratory reagents and materials.

If your team is not able to transition to sustainable shipping packaging immediately, we would like to request a send-back program so that your company can reuse Polystyrene packaging. This would benefit your company as you will have to produce/purchase fewer Polystyrene shipping containers. This will benefit our campus as the end-of-life waste challenges of this non-recyclable material will not be a burden on our custodial and waste disposal teams, which currently are not able to recycle the material.

Thank you.

Styrofoam petition

We, the staff, students, and faculty at Caltech, sign below to support the reduction of Polystyrene (Styrofoam) waste at Caltech.

Polystyrene has [massive effects on our planet](#) and [does not biodegrade](#). It is made from fossil fuels that are non-renewable and chemicals that can leach into and [contaminate our environment](#). Animals [ingest this material](#) and can be poisoned or killed. Polystyrene is considered a possible carcinogen by the [National Institutes of Health](#). This material is [not able to be recycled](#) in Pasadena and its sale and distribution has been [banned](#) in Pasadena as of [April, 2023](#).

Signers of this petition commit to asking vendors to reduce their reliance Polystyrene and transition to more [sustainable](#), [recyclable](#), or [compostable](#) options that are [just as effective](#) as Polystyrene, and/or participating in send-back programs to re-use their Polystyrene containers. Signers will also commit to aggregating our orders when possible, choosing vendors that offer more sustainable shipping solutions, and investigating Polystyrene recycling, reduction, or re-use programs on our campus.

We as scientists are acutely aware of [the negative impact](#) our research often has on the environment. By working towards a more sustainable future, and by asking for more sustainable resources for our research, we are eager to add fuel to this proverbial fire to continue the success of our sustainable programs and initiatives.

Please sign below to show your commitment to this initiative.

We, the staff, students, and faculty at Caltech, sign below to support the reduction of Polystyrene (Styrofoam) waste at Caltech.

Polystyrene has [massive effects on our planet](#) and [does not biodegrade](#). It is made from fossil fuels that are non-renewable and chemicals that can leach into and [contaminate our environment](#). Animals [ingest this material](#) and can be poisoned or killed. Polystyrene is considered a possible carcinogen by the [National Institutes of Health](#). This material is [not able to be recycled](#) in Pasadena and its sale and distribution has been [banned](#) in Pasadena as of [April, 2023](#).

We are asking labs to commit to:

1. Asking vendors to reduce their reliance Polystyrene (Styrofoam) and transition to more [sustainable](#), [recyclable](#), or [compostable](#) options that are [just as effective](#) as Polystyrene.
2. Asking vendors to offer send-back programs to reuse their Polystyrene containers.
3. Where possible, asking labs aggregate or reduce our purchases that rely on Polystyrene, and/or to choose vendors that offer more sustainable shipping solutions.
4. Investigating Polystyrene recycling, reduction, or re-use programs on our campus.

We as scientists are acutely aware of [the negative impact](#) our research often has on the environment. By working towards a more sustainable future, and by asking for more sustainable resources for our research, we are eager to add fuel to this proverbial fire to continue the success of our sustainable programs and initiatives.

We as scientists are acutely aware of [the negative impact](#) our research often has on the environment. By working towards a more sustainable future, and by asking for more sustainable resources for our research, we are eager to add fuel to this proverbial fire to continue the success of our sustainable programs and initiatives.

Please sign below to show your commitment to this initiative.

Email for vendor without stockroom:

I hope you're well. I am the lab manager for the Prober Lab, and I am helping to coordinate the Green Labs group at Caltech. One of the projects we are working on is reducing, reusing, and recycling shipping materials, especially Polystyrene (Styrofoam) and ice packs on our campus. NEB is an ideal case as we place a large number of orders from you, and your team is already working on Polystyrene packaging replacement (though this transition is not complete). If we can work with your team to establish a Polystyrene and ice pack reduction/reuse program, as outlined below, we hope to implement similar changes with other vendors using this program as an example. Green Labs would also love to highlight all the sustainable work NEB is doing, and partnering with you to get this program off the ground is a great way to do that in a way that benefits both Caltech and NEB.

As such, we are hoping to encourage the complete transition of NEB's utilization of Polystyrene packaging to more [sustainable](#), [recyclable](#), or [compostable](#) options that are [just as effective](#) as Polystyrene. We understand, however, that your team may not be able to transition to sustainable shipping packaging immediately. In the meantime, we would like to see if your team would be willing to

participate in a send-back program so that your company can reuse Polystyrene (or other) packaging and ice packs. Alternatively, would it be possible for your team to establish a drop-off point on campus to return and reuse Polystyrene (or other) packaging and ice packs? Lastly, we wonder if your team would be amenable to order aggregation? If so, what would this entail on your end (ie. Are you willing or able to collaborate with a stockroom/mailroom that has -80C and/or -20C access or storage? Is your team able to aggregate orders and ship them out once or twice a week? Can the your shipping department handle such a system?) and what would you need from purchasers (ie. Would we have to put the address of a stockroom instead of our lab into TechMart?) to indicate participating (or non-participating “rush”) orders?

This program would benefit your company as you will have to produce/purchase fewer Polystyrene (or other) shipping containers and ice packs. Furthermore, your group would reduce the number of shipments to campus, thus reducing shipping costs for NEB. As such, to incentivise labs to participate in this program, do you think NEB would be able to provide a discount or other incentives?

This program will also benefit our campus as the end-of-life waste challenges of these [non-recyclable](#) and [non-biodegradable](#) materials will not be a burden on our custodial and waste disposal teams, which currently are not able to recycle Polystyrene or ice packs. Polystyrene has [massive effects on our planet](#) and is made from fossil fuels that are non-renewable and chemicals that can leach into and [contaminate our environment](#). Animals [ingest this material](#) and can be poisoned or killed. Polystyrene is considered a possible carcinogen by the [National Institutes of Health](#).

As such, Caltech is eager to begin a reduction/reuse program like this and NEB is an ideal case for implementing such a program. We are also investigating recycling programs for Polystyrene, but first and foremost we want to investigate reduction/reuse. Please feel free to pass this email along to anyone on your team able to help us begin this program. We are also happy to set up a meeting to discuss this program further, just let us know when works best for your team.

All our best,

Green Labs

Fume Hoods

- Consume 3.5x as much energy as a house
- Many examples of things like 6 foot long fume hood in a tiny room!
- Sash intelligence **reduces energy use by 75%** and is safer for users
 - o Automatic closures and alarms
 - o Sticker indicators



- - Caltech has 713 +/-20 fume hoods
 - Jesse Flores, Mary Obbink, Kari Myers, Alex Sanchez, Seth Fink, Javier Valencia
 - Much of the data is missing (installation date, age, vendor/model)
 - Only 116 are alarmed (16%)!
 - MIT study
 - [MIT added Motion and Sash Height \(MASH\) alarms](#) to ~50 fume hoods (\$20-\$50)
 - Saw a significant decrease in sash height after alarms added!
 - Estimated energy cost savings
 - \$410.74 per fume hood (3,734 kWh/year)
 - Steam and chilled water, adding an additional \$748.26
 - Total of \$1,159/fume hood
 - Extrapolate that to CA energy costs:

- \$743.07/fume hood
 - Add in steam and chilled water costs
 - \$1,491.33/fume hood/year
 - (assuming same values as MIT of \$748.26)
- 713 fume hoods (-116 alarmed*)
 - Cost \$29,850 (\$50 each)
 - Saving \$443,612 - \$890,324
 - (*presuming proper use)
- Inventory updates
 - Help facilities monitor fume hoods
 - Help find older models that are using more energy that can be updated to newer models
- Make and/or install alarms or sash height stickers
- Monitor fume hood sash height
 - Shut the Sash initiatives
 - Increase exposure to safer practices
 - Increase compliance and safety

ULT Freezers

- ~150 (+/-15) ULTs on campus
 - Jesse Flores, Tim Winiacki, Tan Benjakalyakorn, and Ernest Katacha
 - Data incomplete!
- Average of 11.16 – 19** kWh/day if at -80°C
 - (**likely underestimation due to aging models requiring more energy, may be as much as 25 kWh/day, or as much as a home!)
- At -80°C \$0.19 per kWh
 - \$116,052 - \$197,648
- At -70°C saved 30% energy (on average)
 - \$81,236 – \$138,353
- SAVINGS of \$34,816 – \$59,294 per year
 - Understand hesitancy to change temperature to -70, but resources available suggesting -70 is a safe storage temperature
 - <https://news.mit.edu/2017/putting-the-freeze-on-lab-energy-waste-0809>
 - <https://www.freezerchallenge.org/sample-storage-temp-info.html>
 -
- Inventory updates
 - Help facilities monitor freezers
 - Help find older models that are using more energy that can be updated to newer models and incentivize!
- Encourage (each lab will have different solutions!)
 - Adjustment to -70°C to save 30% energy (on average)
 - Divestment by asking labs to inventory supplies and get rid of old samples/legacy freezers
 - Trade-in to more efficient models

- Studies on sample stability (with NIH)

Autoclave Share Program

- Facilities only tracking 6 (6!) autoclaves, rest are unknown!!!!
- Chen has autoclaves on every floor
 - Ubiquitous
 - Used for 1-7 hours/day
 - Some issues with water pressure
- Are models available with water regulators that reduce water use
 - Cold water is continuously sent down the drain below an autoclave just in case hot condensate is flushed down the drain too
 - Water regulators/misters prevents the cold water necessity, **reducing water use by 99%**
- Improvements include replacing steam-jacketed models with non-steam jacketed models
 - **70% less water use, 19% less energy use**
 - Green Labs working on running the autoclaves less often

AUTOCLAVE RUN SCHEDULE

RUN AUTOCLAVES ONLY WHEN FULL!
SCHEDULE AUTOCLAVE RUNS WITH YOUR
NEIGHBORS - WATER CONSERVATION PROTECTS OUR
OCEANS



Day	Lab	Time
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Caltech
green
labs



Check out the Green Labs
website for more tips and tricks
to make your lab more
sustainable!



Sustainably printed on 100% recycled paper!

Equipment/Glassware/Chemical Exchange Program

- Prevent over- or unnecessary-purchasing
- Beneficial for teaching laboratories
- More equitable usage of resources
- Reduces reliance on supply chains that can lead to shortages
- Currently just an online spreadsheet
 - Hope to ask for space once more established (our initial requests were denied)
- Can also utilize other spaces to donate like LEAP program

Vivarium Composting

- ~4000-6000 cages at any time
 - o Bedding changed every week, 120 g each time
 - o **Over 37,440 kg bedding / year**
 - Currently it is removed from cages and sent to dump
 - Solutions exist to compost this waste!
 - o Since it is not integrated is much more difficult to implement
-

Other project updates not discussed in the meeting

- Grenova Tip Washer Pilot Project
 - o KM: Grant due in October worth 150K, website has descriptions of old projects they have funded, metrics (like carbon, water, energy) are favoured, and they want to know what aspect this study offsets (even though tip washing is not necessarily research, we do move the needle on water and energy etc use)
 - o KM: we are visiting a labcore in a few weeks to see operation in action, hopefully they can advocate for the machine, we want to hear about their experiences
 - o We are looking into getting one like in the picture (below) with 2 storage units with UV sterilization, a washer below, and carboys on the bottom rack
 - o KM, Jaziel, VK, TC contributed
 - o RSI mostly for chemistry mostly for research,
 - o Validated to wash tips, hope they will see it as applicable
 - o Use liquid handler in BI during non-science hours to run the Grenova tip washer
 - o Comments:
 - JL: Will want to demonstrate non-filters are fine
 - KM: Part of our campaign, test for qPCR
 - CR: change rhythms and rerack might need to be part of campaign, track time of putting them back in the rack vs dumping them,
 - KM: multichannel users might be easier to incorporate this for
 - KM: even folks who use liquid handlers might be a market
 - JL: need to be in racks not just dumped out?
 - o KM: correct, need to be re-racked
 - KM: need to wash in batches of similar brands and types together to maximise washes, another factor in our campaign

Plans for 2024 - Sending out an [anonymous Google Forms](#) sheet for folks to provide feedback also!

All answers here are anonymized and given in normal text. **Questions are bolded.** Feedback is left normal.

Notes from 230908:

- **Does anyone else want to give an update on an ongoing project?**
- **How do folks feel about our group?**
 - o **Does it need a different structure?**
 - o **Are emails effective? Are meetings?**
 - o The group thinks monthly meetings are good, could make it every 6 weeks or skip one if needed though
 - o Monthly meetings help everyone stay on track and remind them to get work done on projects
 - o Updates at the beginning of the meeting are good, but we could prioritize them or chose a single one to focus on
 - This might give others a chance to present and have a more in-depth discussion of our ongoing projects rather than the surface-level of the updates
 - TC will email around the week before to see if anyone wants to present, take 15 mins or so to present it properly and then discuss
 - Could leave more time to float ideas and discuss, don't want to be too rigorous, folks like that the meetings are fluid and we have time to talk about the projects in depth, don't over-structuralize it
 - o Emails
 - Sometimes too long
 - Might put a TL;DR at beginning, then keep rest of the email since some folks are interested
 - Could work on underlining or colour-coding emails
 - Highlight main point at beginning then move on to larger email below
 -
- **What projects from 2023 worked well? Which ones need some work?**
 - o Lomi
 - o Pipette box
 - Need to make it apply to more vendors, in 2024 may take data collected and see if BBE/facilities is willing to incorporate this into their workflows and take responsibility for this waste, asking the reps to do it indefinitely seems like a bad plan
 - Want to get more vendors on board as well (as discussed above, with Rainin etc)
 - Make it accessible to all of campus
 - o -70/80
 - Only know how it is going after 1 year, so working on getting samples
 - o Certification (discussed below)
 - o Grenova (discussed above)
 - o Keeping a line to DW is useful, talk to him twice a year or so to keep him updated, metrics on these projects crucial so TC will continue to monitor and report
 - o MC on board for initiatives but he has more of a facilities angle, try to get him on board with taking these projects to the next level
- **What can we do better to encourage Green Labs Certification?**
 - o **What has held folks back?**

- Need to maintain certification, so focussing on re-up project to keep labs engaged in years after initial certification
 - Could have program where they submit new form (or same form) and get a sticker of participation to show they have done it year after year
 - Try for representatives in each lab, related to safety training/safety officers
 - DW didn't like this idea, but we want to broach it again, those members could come to the meeting and incorporate changes into their labs
 - Should try to target safety officers in each lab to incorporate sustainability, point them to recycling etc, promote green behaviours
 - Could make a flip book (like the emergency response guide) for every lab, or a postcard version of the Guide
 - Events useful to keeping up engagement of new labs, barrier low, good amenities to labs that are certified
 - Trainees may be intimidated about participating, especially if they are not involved in purchasing, and Lab manager might be busy
 - Line to senior staff crucial, if they are behind it it is more likely to succeed, reach out to them more directly and make it clear that junior researchers can participate
 - **What do folks want to focus on for 2024?**
 - Getting safety officers involved in this process
 - Folks really liked the postcard idea!
 - Lab manager can assign that job to someone,
 - Want more EHS involvement, incorporate GL into safety training somehow (maybe reach out to Brena since sometimes folks have trouble reaching other EHS members)
 - More PI involvement
 - Presenting to PIs, probably next Feb, need to make more signage and make them more aware of the program to decrease barrier or disinterest
 - Targeted emails to PIs
 - Expand the program, especially to Chemistry
 - Want to post signs in Crellin, Noyes, Church etc
 - Present to PIs in Chem (and in BBE) and maybe elsewhere?
 - Maybe present to Chem GSA?
 - Contact Paula Martinez for getting into the Chem newsletter
 - Use the Admins network (who do they report to?) maybe Ann Mao
 - RSI involvement
 - Capitalize on the fact that the building is opening in 2024
 - Make them walk the walk
 - Talk to faculty in RSI, having a person in their organization involved with GL will get us a seat at the table? And also get the word out about our work
 - Talk to Dianne Newman, and others, to spread the word also
 - Come to them with DATA, especially those related to costs, energy audit needs to be made available and put at the forefront
- (ran out of time, so next questions saved for next time!)

Notes from 231013

- **What goals should we have for our group in 2024? What about in our labs?**
 - Sustainability Committee
 - We need to be more involved, BY knows someone on the council and might be a good advocate/connection, BY will reach out
 - Discuss things like the social cost of carbon?
 - We are still using 30% coal power to power campus, new buildings are on fuel cells
 - Tyrrell not willing to commit to percentage reduced , but we could advocate for that in our recommendations (discussed below)
 - [Sustainability report](#)
 - Has lots of our pictures and programs but we are not cited 😞
 - Follow up with Max about this
 - Caltech is riding our coattails and virtue-signalling, taking credit for our work
 - Sustainability survey! For anyone
 - **From BY: GSC sustainability survey: <https://forms.gle/sDD8BcBGHr5sE57o6>. This survey will be open from Monday, 10/9, through end-of-day on Sunday, 10/22.** Anonymous summary statistics from this survey will be shared publicly, including with the [Caltech Sustainability Advisory Council](#) to inform campus planning efforts.
 - In the email summary TC will include language if we want to coordinate, put language below also
 - Green Labs will send David Warren recommendations at end of year
 - NS: Getting PIS to sign the recommendations will make a huge difference
 - Ask Dianne Newman, Pamela Bjorkman, David Prober...
 - RSI – CGSC mailing list?
 - Slow start, no new labs joining, just shared lab spaces for existing professors
 - Could talk to Nate Glasser – scientist at RSI, Newman Lab, will direct the center
 - Dianne Newman also good contact
 - Are events for the opening being planned and how can we help? We should capitalize on this!!
 - What is the status of normal Caltech recycling
 - Especially plastics recycling
 - TC: Caltech struggling to pay custodians, so recycling is not happening as reliably as it should, custodians overwhelmed (not just custodial, but also facilities, OLAR, etc)
 - We can advocate for better pay and more hires
 - We can also advocate to get a better vendor to accept our waste, one that prioritizes recycling
 - BY: EHS handling surprise inspections in Chem – same in BBE?
 - TC: no, we get notice
 - KM: Could be there are previous violations they are checking up on
 - BY: Chemistry use guide – being developed in some labs
 - GL could make something, but it is a lot of work! Specific to labs
 - KM: redundant maybe with the resources on the EHS websites?

- Want to collaborate with getting better safety training for officers esp for green practices
 - Can advocate for every lab to have a sustainability officers and incorporate and engage certified labs especially
 - JL: Joan has a list for sending out stuff to target safety officers, can use that to reach safety officers
 - Green Labs flipbook (similar to the Emergency Response Guides)!!
 - See notes from last time, JA suggested these for posting in labs
 - KM: Good 2024 idea
 - Certification
 - BY: Links are broken in the cert form 😞
 - TC: we will work on updating it in 2024
- **Is the Green Labs Guide useful? What do we want to add to the 2024 version?**
 - **Is the website useful? What things do we want to add/change in 2024?**
 - **Final thoughts/comments/suggestions?**

Suggested Responses for the [GSC Sustainability Survey](#): due before 10/22

Do you have any other comments/thoughts/suggestions related to sustainability in housing and energy?

1. How are you going to ensure rehousing or recycling of old stoves if they are replaced with electric stoves?
2. Could buildings on campus could increase temperatures slightly during the summer, and decrease slightly during the winter so that it is less of a burden to heat/cool (and rooms aren't FREEZING all summer!)
3. Does Caltech have commitments to zero carbon/carbon neutrality also?
4. Are there other sustainability commitments or climate action plans Caltech has committed to? (For example: LEED certification requirements for new buildings, reducing scope 1 and scope 2 greenhouse gas emissions, reducing SOV commutes to campus, etc)

Do you have any other comments/thoughts/suggestions related to food sustainability?

1. It would be nice to host events that are more sustainable or zero-waste at Caltech. Could this be a service that can be made available in the future?
2. Could we partner with local restaurants to encourage sustainable events on campus that do not use Caltech catering?
 - (For example: we could partner with sustainable restaurants nearby. We could ask them to offer us a discount for Caltech employees/staff/faculty. We could also ask that when they deliver our food we they use only

sustainable/compostable cutlery or containers? Could there be a container return program with some of these restaurants?)

3. Can Caltech commit to purchasing food from local or sustainably certified sources (including ethically sourced coffee beans etc)?

Do you have any other comments/thoughts/suggestions related to waste and composting?

1. We would like to recycle Styrofoam and other shipping waste.

2. If we are able to get compostable cutlery, are there places on campus where we can easily access compost bins? If not, could this be made more readily available across campus?

3. How does campus deal with plant waste from the gardens/grassy areas? Is it composted?

- Personal note about carbon offsets: I do not believe these are effective. Recent [studies](#) ([studies](#)) (and [shows!](#)) indicate that this is a way for large companies to be “let off the hook” instead of actually changing their habits and making workflows more sustainable, since they are relying on a third-party organization to plant trees or something else, which many do not end up doing.

Do you have any other comments/thoughts/suggestions related to transportation?

e.g., feedback about ZipCars, mobility/accessibility concerns, etc.

1. Are there initiatives to reduce SOV commutes to campus?

2. Are remote workdays being encouraged? If PIs expect workers/students to come in, are there resources we can provide to show that Caltech is promoting a hybrid/remote workplace?

3. I understand not everyone can take transit to work, especially those with accessibility issues -- are there programs available to help those who must drive due to these mobility/accessibility issues?

Any final suggestions / comments? Ideas for sustainability improvements on campus?

1. I am part of Caltech Green Labs and many of our goals align with yours, can we collaborate?

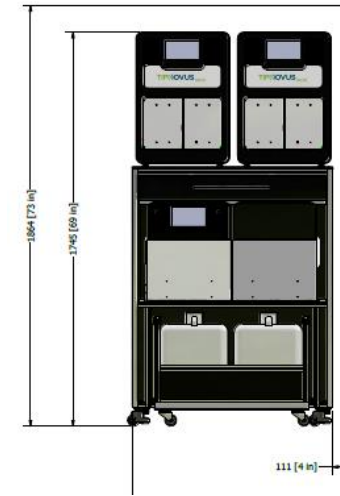
2. Reach out or check out Caltech Green Labs!

3. Can we encourage better recycling practices at Caltech? Currently, not very much of our waste is recycled as the vendor we work with does not support recycling of many products.

4. Can we get Styrofoam recycling on campus?

More information:

- Grenova model



- $-70^{\circ}\text{C}/-80^{\circ}\text{C}$ Comparison Pilot
 - From Lightning Event - Manisha Kapasiawala
 - Collect samples from several interested labs
 - Determine a robust way to compare samples
 - Store in both a -70°C and a -80°C and compare over multiple years
 - Gradinaru lab has a -70°C ?
 - From last meeting
 - JL: he raised this idea with David Warren at the BBE event, we could present the data to the community to convince them with data, using machines with similar ages and same location
 - KM: Jesse Flores may have ability to look at tracking to account for blips in temperature
 - NS: Maz lab would be interested in supplying samples
 - JL: could use sterlings in Freezer Farm (TC, JL, and NS offer their -80s)
 - JL/KM: could keep samples in -20 for a control, use a TX/TL control, do protein, DNA etc, every 6 months take a sample and test it, and just extrapolate data from there
 - We moved on to add to the Drive document
 - Testing
 - Need controls of things that will fail
 - Ask about timing for failure protection
 - Schedule testing schedule for samples (some once a month for 6 months, once in 6 months, and once on year) depending on sample type
 - Include results for 6 months tests in 2024 second quarter newsletter
 - Possibly work into a publication for lab managers or something, help convince PIs, but political
 - Series of magnets or posters for advertisement
 - Make a figure for cost savings on website
 - Ben Bekey found resources online that he will share with group
 - (TC thinks it was this)

- TC will share resources to group and ask that folks continue to plan out the project so it can be underway by August?

Lab	Samples	Timeline	Confirmation Tests
Elowitz	Protein (stored at -80)		Binding on reporter cell lines
Elowitz	Glycerol stocks (perhaps several samples for freeze-thaw)		Plate same volume from same prep for each condition
Elowitz	Cell lines (slow freeze) with replicates (4 for each condition)		Thaw and count viability
Murray	Cell lysate		TX/TL assay
Murray	DNA		TX/TL assay
Sternberg	Worms samples		
Mazmanian	Fecal samples		Sequenece
Prober Lab	Competent cells (perhaps several samples for freeze-thaw controls, do one tube no thaws for 6 months, one tube thaw every month for 6 months)	One tube every 6 month for 6 months and then after 6 more months, one tube at 6 months and one year only, one tube at one year only	Plate on LB and count, could transform
Karethikeyan	Metabolites? DNA/RNA, soil samples, environmental samples? Kept at -70		
Beacon	Kept at -70, different brand than Sterlings		



FALL 2023

GREEN LABS COMPOSTING CHALLENGE

Date: SEPTEMBER – DECEMBER **Who:** CALTECH LABS

Each floor in Chen and the third floor in Broad will compete to turn the most food waste into compost dirt during Fall 2023.

Green Labs will provide a lunch party for the floor that makes the most compost dirt! Second and third prizes will also be provided!



BEFORE → **AFTER**

Download the 30-minute Green Labs Certification Form today and submit it to sustainability@caltech.edu to get Certified today!

Or check our [website](#) for more information about the Lomi, or find Green Labs tips to make your lab more sustainable!

Add your food waste or coffee grounds to compete and start composting today!

Sustainably printed on 100% recycled paper!



NOV. 30TH

GREEN LABS CERTIFICATION CHALLENGE

Date: FRIDAY, NOVEMBER 30TH **Who:** CALTECH LABS

Certified labs will be rewarded with a Certified Green Labs Plaque, and access to exclusive events and swag (including free recycling bins and efficiency signage and stickers).

If your lab is Green Labs Certified by FRIDAY, NOVEMBER 30TH, Green Labs is inviting your lab to have a tasty treat and enter a fun raffle at a top-secret location only given to those most excellent and certified green labs.




Download the Certification Form today!
Event Date: Top-secret
Event Location: Top-secret
All Certified Labs are welcome!

Start your Green Labs Certification today!

Or check our [website](#) for more information about this event or find Green Labs tips to make your lab more sustainable!

Sustainably printed on 100% recycled paper!




CALL FOR SAMPLES

TO COMPARE -70°C AND -80°C FREEZERS

Dates: August 1 – December 31 (and beyond!) **Who:** ANY CALTECH LABS

Green Labs is calling for samples for a student-led study comparing samples held at -20°C, -70°C and -80°C in the Chen Freezer Farm. Samples from various labs will be tested and compared at intervals over a period of up to 5 years.

We hope that by conducting a controlled study at Caltech, we can provide evidence for labs to change their -80°C freezers to -70°C, ensuring an energy savings of up to 30%! Below are some additional resources suggesting that -70°C is a safe storage temperature for many kinds of samples. Use the QR code below to sign up to contribute a sample!



Sign up to contribute samples here. All labs are welcome to contribute samples for our long-term study!

Want to make your lab sustainable? Check out our [website](#) or download the Green Labs Certification Form!

Here are some resources suggesting that -70°C is a safe storage temperature for many kinds of samples!

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SPRING 2023

LAB SPRING CLEAN COMPETITION

Competition: JANUARY – APRIL Participants will compete to clean their labs top to bottom by cleaning out freezers, organizing storage spaces, and taking inventory of lab supplies!

Lunch Party: MAY 1

Who: CALTECH LABS



RSVP your lab by Sept. 15!
All Labs are welcome!



Or check our website for more information about this event or find Green Labs tips to make your lab more sustainable!

Each participating lab will provide pictures of their cleanup by **midnight APRIL 31ST**. Prizes will be given for the biggest before and after difference, and for the "weirdest thing found".

The day after the competition ends, Green Labs is inviting all participating labs to have a sustainable lunch on us!



Download the Certification Form today!





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STYROFOAM RECYCLING GUIDE

Follow EH&S Guidelines for biohazardous, radioactive, chemical, and electronic waste

ONLY CLEAN, WHITE #6 EPS FOAM





PLEASE DO NOT INCLUDE:



TAPE



PACKING PEANUTS



FOAM INSERTS



STYROFOAM CUPS OR PLATES



PACKING LABELS



CARDBOARD OR INSULATION



ICE PACKS



Check out the Green Labs website for more tips and tricks to make your lab more sustainable!



Sustainably printed on 100% recycled paper!

WE'RE PRETTY CHILL...

WE SWITCHED FROM -80°C TO -70°C



greenlabs.caltech.edu

✓ EXTENDING THE FREEZER'S LIFE

✓ SAVING ENERGY



greenlabsinfo@caltech.edu

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5 EASY STEPS TO MAKE FREEZERS LAST

KEEP YOUR FREEZER RUNNING IN TOP CONDITION AND SAFEGUARD YOUR SAMPLES

1. **ROUTINELY REMOVE ICE BUILDUP**
 - ON doors, shelves, and gaskets by gently cleaning with an ice scraper or soft cloth. Be extra careful to not damage gaskets and door seals.
 - You can rent a backup freezer by emailing Jesse Flores at floresj@caltech.edu.
2. **LET IT BREATHE**
 - A dirty filter can be cleaned by removing it from the freezer and rinsing it thoroughly with water.
 - Vacuum the cooling condenser coils to keep them free from dust and debris and ensure plenty of space for air circulation and heat exchange.
3. **CLEAN OUT YOUR FREEZERS TO SAVE SPACE AND SAVE TIME SPENT LOOKING FOR SAMPLES**
 - Past cleanouts have increased freezer space by up to 30%.
 - Keep 6" of space around, behind, and on top of your freezer.
4. **KEEP TRACK OF WHAT'S INSIDE**
 - Organized samples are easily accessible.
 - Laminated spreadsheets posted on freezer doors or barcoded inventory systems are methods that have worked for many labs.
5. **MAKE SMART PURCHASING DECISIONS**
 - Avoid purchasing a new unit by cleaning out, consolidating samples, and sharing space.
 - If you absolutely need a new unit, select an energy efficient one, and check sustainability@caltech.edu for information about rebate programs.
 - Subscribe to the Green Labs Marketplace listserv where labs can share equipment and chemicals.

Visit <https://www.freezerchallenge.org/> to register and participate in the International Freezer Challenge to win great prizes and become more sustainable!





FREEZER MAINTENANCE CHECKLIST

Freezer maintenance should be performed biannually to ensure you have the healthiest freezer possible! Check off these duties to guarantee that your freezer's life is prolonged and efficient.

DATE COMPLETED	INCOMPLETE	DETAILS
		<ul style="list-style-type: none"> • Remove accumulated dust on freezer coils with a vacuum or a gloved hand, make sure to move with the direction of the coils. Most freezers have their coils in the front of the freezer. • Remove/open the grille in the front of the freezer to access the freezer coils.
		<ul style="list-style-type: none"> • Rinse or vacuum the freezer filter every 3-4 months to ensure the ULT freezer is working as efficiently as possible. If rinsing the freezer filter, allow the freezer filter to fully dry before placing the filter back in the grille. • Remove/open the grille in the front of the freezer to access the freezer coils. • If the freezer filter needs to be replaced, email greenlabsinfo@caltech.edu for assistance.
		<ul style="list-style-type: none"> • Check door seals for any ice buildup. In the event of ice buildup, gently wipe away the ice with a cloth or soft brush. If ice has hardened, carefully chip it away using an ice scraper. Do not use any blunt objects (hammers, screwdrivers, etc.) to remove the ice, as this can permanently damage the freezer!
		<ul style="list-style-type: none"> • Defrost the freezer (applicable to ULT and -20°C freezers) annually or biannually. If the freezer has built up more than 1/8" ice, the freezer becomes much more inefficient and can compromise sample integrity. • When defrosting a freezer, make sure to allow one day for ice to thaw and melt. Use plenty of towels and ice bins to prevent flooding in the lab. • If possible, place your freezers near an air vent in your lab to allow for proper air circulation. Do not store items on top of your freezer, as this causes heat to build up behind the freezer and can overwork the compressor.
		<ul style="list-style-type: none"> • When possible, eliminate old, low-priority samples from freezers to reduce occupied freezer space. • Consult the freezer's manual for any additional freezer maintenance that should be performed.

