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# COLD STORAGE

# SLIDES

Visit the Energy Star website for more information: <https://www.energystar.gov/productfinder/>

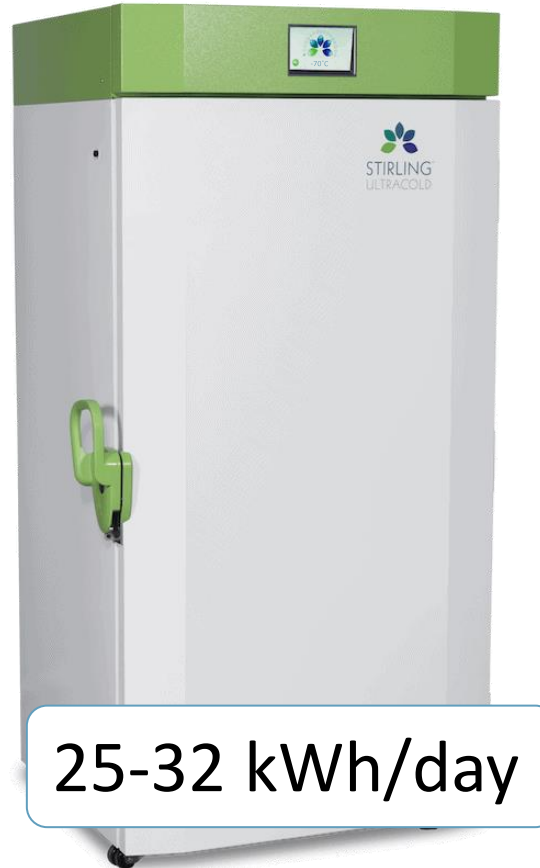
Any questions please email: [greenlabsinfo@caltech.edu](mailto:greenlabsinfo@caltech.edu)

For more information visit <https://greenlabs.caltech.edu>

# Did you know?

A single  $-80^{\circ}\text{C}$  Ultra-Low Temperature (ULT) freezer uses the same amount of energy as a house EVERY DAY!

Switching to  $-70^{\circ}\text{C}$  means your freezer uses 30% less energy!



30 kWh/day

# Temperature Tuning

Switching your  $-80^{\circ}\text{C}$  to  $-70^{\circ}\text{C}$  means your freezer uses [30% less energy!](#)

Check out [these studies](#) (or other useful references) showing that  $-70^{\circ}\text{C}$  is a safe temperature to store samples!

Also consider storing samples at appropriate temperatures (for example: consider storing DNA in a  $-20^{\circ}\text{C}$  freezer instead of a  $-80^{\circ}\text{C}$ ).



# What can you do?

1. ADJUST -80°C ULT freezer temperatures to -70°C. This generates energy savings of up to 30%! Not only that, “chilling up” your ULTs mean that they will last longer and require fewer defrosts a year!
2. UPGRADE an older unit to a more energy efficient unit, using the Caltech Freezer Rebate Program (see the [FREEZER REBATE website](#)) for information on freezer rebates, and to save between \$2,000 and \$8,500!).
3. REDUCE the number of freezers you have by regularly clearing out old samples, keeping a sample inventory, organizing samples into racks, sharing cold storage units with other labs, or switching to room temperature, -20°C, or 4°C sample storage!

# Materials Management

1. Monitor your freezers remotely.
2. Inventory your samples.
3. Clean out unneeded, expired, or unidentifiable samples.
4. Utilize high density storage boxes that store 100 samples rather than 81 samples.
5. Use racking systems to stay organized and use space efficiently.
6. Create an online inventory that is searchable, which will reduce time spent searching with freezers open!

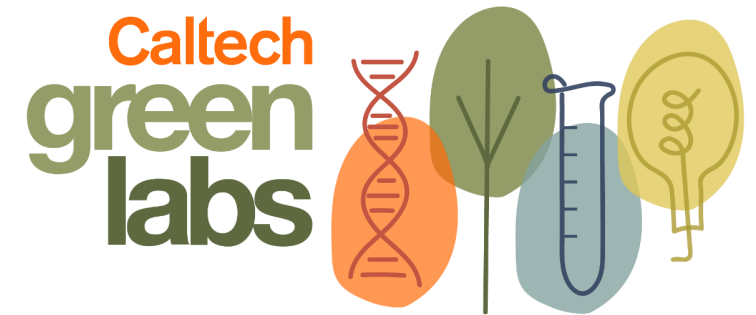




# Freezer Defrost How-To Guide

1. Defrost freezers at least once a year! Consider also brushing off frost from the gasket around the door seals and remove dust from the intake and coils with a vacuum.
2. Make sure your alternate freezer is at your required temperature (if needed you can book an extra freezer by emailing [bbereceiving@caltech.edu](mailto:bbereceiving@caltech.edu))
3. Take a picture of your freezer so you remember where everything went before the transfer.
4. Move freezer racks into the new freezer using a cart, keeping the order the same as in the original freezer if possible.
5. Put any loose items (in doors, on shelves etc.) in bins and transfer those to the alternate freezer.
6. Turn off your now-empty lab freezer and set out trays or bins to collect the melting ice (we like to use the autoclave bins!). Cloths can be used to direct drips. Post a sign near or on the freezer to warn lab members of potential slipping hazards.
7. Once all the ice is melted, wipe out the freezer with a dry cloth and then turn on the freezer.
8. Once the freezer is at the correct temperature, put all items back in, following your picture as a guide.
9. Inventory your freezer to make it easier to find things, meaning your lab spend fewer minutes with the door open (and reducing the number of defrosts you must do every year!). Green Labs has inventory sheets available in multiple forms on our website.

Contributors (alphabetical order):  
Jaasiel Alvarez, Ben Ben, Tasha  
Cammidge, Darren Chieng, Yun Chiu,  
Stephanie Connon, Jasmine Emtage,  
Genevieve Gandara, Cathryn Holmes,  
Dennis Ko, Vijaya Kumar, Annie Lam,  
James Linton, Kate Malecek, Alyssa  
Player, Tatiana Solovieva, Honami  
Tanaka.



Any questions please email: [greenlabsinfo@caltech.edu](mailto:greenlabsinfo@caltech.edu)

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# References and Additional Information

[Visit our fact sheets website for more information!](https://greenlabs.caltech.edu/resources/fact-sheets) (https://greenlabs.caltech.edu/resources/fact-sheets)

- Is keeping our ultra-low temperature freezer at -70C just as good as -80C? Short answer: YES! Here are some references to support our claim, and keep an eye out for results from our year-long study!
- [Sample Storage Temperature Comparisons](https://www.freezerchallenge.org/sample-storage-temp-info.html) (https://www.freezerchallenge.org/sample-storage-temp-info.html)
- [Caltech Sustainability -70C/-80C Case Study](https://sustainability.caltech.edu/documents/22988/Green_Labs_Network_Case_Study.pdf) (https://sustainability.caltech.edu/documents/22988/Green\_Labs\_Network\_Case\_Study.pdf)
- Additional links with advice on how to keep your freezer running optimally:
- [Freezer Best Practices Overview](https://www.freezerchallenge.org/best-practices-overview.html) (https://www.freezerchallenge.org/best-practices-overview.html)
- [Improving Freezer Efficiency Is \(Ultra\) Cool!](https://www.bchgreenlabs.com/initiatives/improving-freezer-efficiency-is-ultra-cool) (https://www.bchgreenlabs.com/initiatives/improving-freezer-efficiency-is-ultra-cool)
- [9 Ways to Make Your Refrigerator More Efficient](https://energized.edison.com/stories/9-ways-to-make-your-refrigerator-more-efficient) (https://energized.edison.com/stories/9-ways-to-make-your-refrigerator-more-efficient)
- Additional studies and links:
- [Caltech Freezer Rebate Program](https://sustainability.caltech.edu/campus/buildings/freezer-program) (save between \$2,000 and \$8,500 on a new freezer!) (https://sustainability.caltech.edu/campus/buildings/freezer-program)
- [MIT: Putting the Freeze on Lab Energy Waste](https://news.mit.edu/2017/putting-the-freeze-on-lab-energy-waste-0809) (https://news.mit.edu/2017/putting-the-freeze-on-lab-energy-waste-0809)
- Useful References List (https://drive.google.com/drive/folders/1BT6UvpoZTB17UayWBLDtzvLUtwpnNI1U?usp=drive\_link)