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University

Lab Waste Audit Toolkit

A step-by-step process to reduce plastic waste in the lab.



Acknowledgements

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This guide was developed as part of the Plastic Planet initiative at Stanford University. It is based on information adapted from a Brachytherapy Waste Audit Toolkit provided by Julie Muir and the Stanford Zero Waste team, and from first-hand experience conducting a waste audit in the LaBeaud Lab and the Tarpeh Lab.

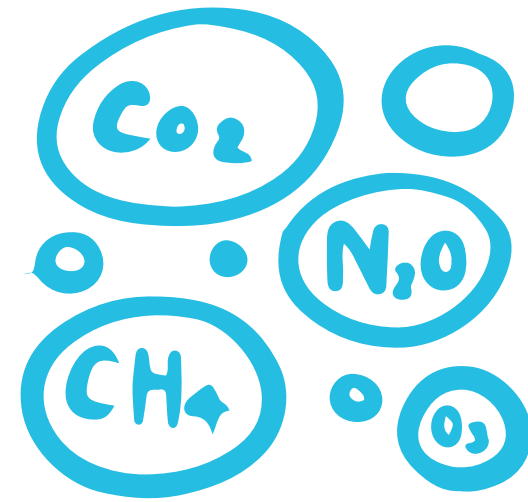


Goals



Reduce Plastic Waste

Labs generate 12 billion tons of plastic waste each year. This is equivalent to the weight of 67 cruise ships.



Reduce Greenhouse Gas Emissions

Plastic production and incineration contribute to global greenhouse gas emissions.



Learn Waste Stream Rules

Different cities have different guidelines for disposing of waste, so it's important to learn how to sort waste into the proper waste streams.



Develop Sustainable Lab Culture

Make sustainability a priority in the lab. This can help your lab stand out in grant applications.





A Note on Waste Sorting

Why is waste sorting so important? Even if your lab reduces waste, improper waste sorting can contaminate waste streams. This could cause the contents of an entire recycling bin to end up in the landfill, undermining your lab's efforts to reduce waste.

Examples of waste in the wrong waste stream are:

1. Cardboard in the landfill stream
2. Unrecyclable plastic in the plastic recycling bin

Questions to Ask Yourself

1. What is being thrown away that doesn't need to be?
2. Where is waste ending up within the lab?
3. Is this reusable, compostable, recyclable, biohazardous or landfill?
4. How can I rethink this procedure to use less material?



Let's get started! →

The Process

Simple steps for a waste audit.



Phase 1

Planning and Team Assembly



Establish team leader and core members

Team members will keep the project on track and handle supply acquisition, data collection, and data analysis. Ideally 2-5 core members.



Note on hazardous waste

Different options for dealing with hazardous waste include: excluding it from the audit or analyzing it as a separate category using precautions.



Hold an initial meeting

Discuss the following

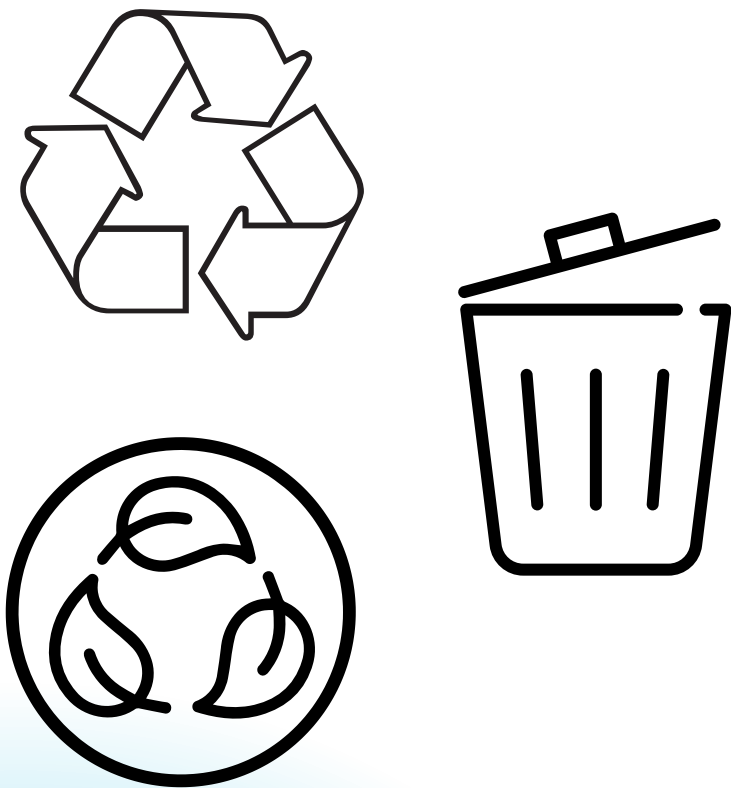
1. Waste audit goals
2. Waste components to target, categorized by waste stream (example on next slide)
3. Length of waste audit (2 weeks recommended)
4. Date, time, and location for sorting/data analysis meetings

Waste categorization →



Phase 1

Planning and Team Assembly



Don't be shy, contact the Office of Sustainability if you have questions about how to properly categorize your waste!

Waste Streams	Subgroup Examples
Paper Recycling	
Cardboard Recycling	
Plastic Recycling	
Unique Recycling	Nitrile gloves
	Pipette tip trays / boxes
Landfill	Weigh boats
	Styrofoam
	Vials
	Pipette tips
	Plastic packaging / non-rigid
	Parafilm / wrapping
	Misc.
Compost	
Biohazardous waste	





Phase 2

Preparation

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Make supply list

1. Scale (charged)
2. Large tarp on which to put unsorted trash
3. Large container for each waste stream (no lids)
4. Labels for each waste stream container

Set target dates and assignments

1. Supplies preparation
2. Dates of audit
3. Data analysis and results

Identify stakeholders

Consider who should be informed – lab members who are not part of core team, housekeeping and waste management staff (collect names and contact info)

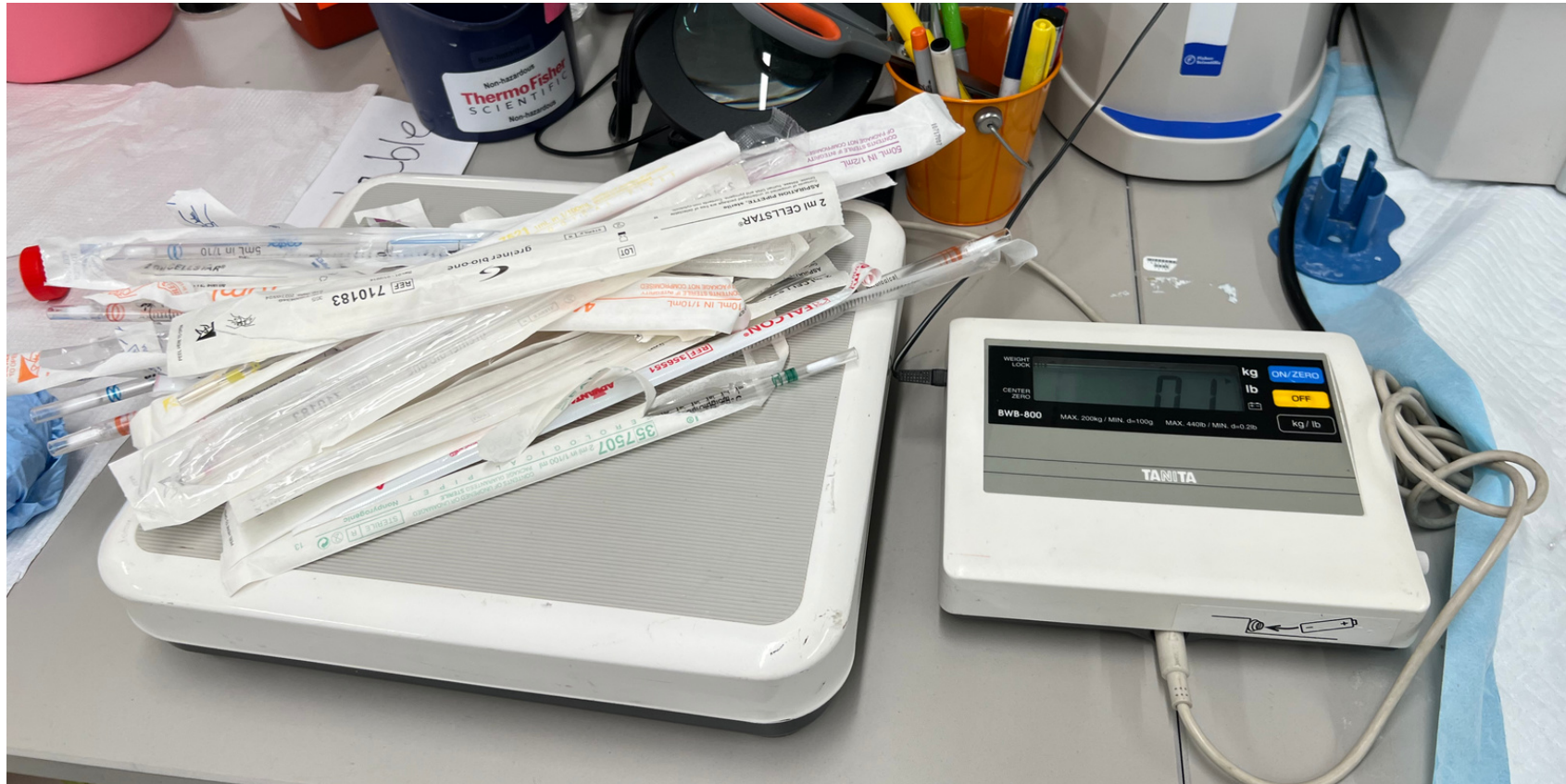




Phase 3

Data Collection

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Instructions

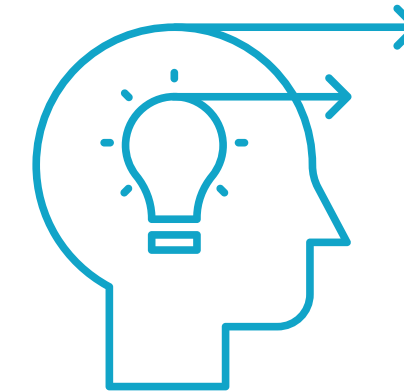
1. Lab members should dispose of their waste in the appropriate waste containers throughout the day.
2. At the end of the day, the waste containers should be stored in a designated area where custodians will not get rid of the collected waste.
3. At the end of the week, containers should be sorted by subgroup.
4. Contents of each subgroup should be photographed and weighed.
5. Weight data should be entered into a spreadsheet.
6. Repeat for Week 2.





Phase 4

Data Analysis



Analyze the data. Answer these questions:

1. Which waste stream(s) and subgroup(s) produce the most waste?
2. How is the waste being disposed of? Is it being sorted correctly?
3. Are there substitutes or procedural changes that could mitigate the amount of waste going to the landfill?

Select 1-3 interventions

Consider the feasibility and impact of implementing these interventions.

Meet with stakeholders

Present progress, findings, and next steps. Do all stakeholders agree with the plan forward?





Phase 5

Implement Changes

Questions to consider as you prepare:

1. What materials are needed for the interventions? Where is the funding for new materials coming from?
2. Who will be involved in implementing these changes?
3. What is the timeline for implementing the proposed changes? All at once? Stagger the rollout?
4. What data needs to be collected to evaluate the interventions? Who will collect this data?

Tips going forward:

1. Create a lab waste manual
2. Include waste sorting brief during new lab member orientation
3. Use plastic alternatives as much as possible - metal, glass, wood!



Extra Resources

Implementing the Three R's

Reduce

1. Change to a supplier that uses more sustainable materials
2. Contact your current supplier to suggest producing with plastic alternatives and encouraging sustainable designs
3. Discuss plastic alternatives with colleagues
4. Packaging (including boxes, plastic wrap, and directions) creates lots of waste. Consolidate supply orders to one supplier, reduce orders, order with neighboring labs, buy in bulk to reduce shipments (if there is storage space)

Reuse

1. Reuse coolers and gel packs from packaging
2. Donate extra supplies to other labs

Recycle

1. Some solvents are recyclable. Look into distillation systems and cleanable solvents
2. Invest in solvent recovery equipment
3. When waste cannot go into the recycling stream, consider utilizing other programs, such as Kimberly Clark, TerraCycle, and Medline for gloves, and Corning Recycles for packaging

Cardinal Green Labs

Stanford's Office of Sustainability created Cardinal Green Labs, which offers a program on lab waste. This program provides guidelines and resources for disposing of and reducing lab waste. Navigate to the Cardinal Green Labs website to find:

1. Sustainable Lab Products Catalog
2. Lab Supplies Share
3. Free Lab Recycling Bins
4. Campus Glove Recycling Locations
5. Guidelines for Waste Sorting

Visit: <https://sustainable.stanford.edu/operations/buildings-grounds/labs/waste>



Congratulations on finishing your waste audit! Your sustainable actions will have a positive impact on your school, community, and planet.





References

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- LaBeaud, A. Desiree. “Greening up Your Labs .” ASTMH Green Task Force, 27 Oct. 2022.
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Photo Credit: LaBeaud Lab waste audit