R³ Green Labs
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UCR Green Labs History
2013

Green Labs
Started @ UCR
Research Consumption

Campus-Wide Equipment Energy Consumption

Sources of Consumption:
1. Energy
2. Water (i.e. autoclaves)
3. Waste (i.e. single use plastics)

Fig. 1 Adapted from “Sustainable Stanford,” by Stanford University, 2015
Green Labs Started @ UCR

2013

2016

18 Labs Certified!
Recycling (in Genomics Building)

- Recycling & composting saves 62% waste and reduced landfill by 35%
- Results in cleaner air and water
Campus’s With A Green Lab Program
Developing Our Program
Assembling the Team

Madison:
First year
Environmental Science major

Kylie:
First Year
Computer Science Major

Ella:
PhD Candidate:
Genetics, Genomics & Bioinformatics

David:
Energy Manager

Philippe:
Faculty Researcher

JC:
Hazardous Waste Supervisor
Reducing Lab Waste: 3 Tier System

Building Wide
- LED lights/microscope
- Aerator installation
- Recycling

Lab Certification
- Turn it OFF!/Shut the sash
- Cold storage management
- Recycling

Education and Marketing
- Interactive building workshops
- Surveys
Best Practices
Quick
Create a certification process that can be done in a short time span to induce participation.

Adaptable
Create a certification process that can easily be implemented into common lab procedures without impacting the research.

Beneficial
Create a program with many benefits and resources only available to those that become a certified lab.

Desirable Program
Winter Survey

- 49 Labs Surveyed
- Reasons for Conflict:
  - Not enough Time
  - Dry Lab
  - No waste produced
  - Costly
  - Unattainable
  - Compromising Research
  - No Information
Certification Process
# Certification Standards!

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<th>Achievement'</th>
<th>Wet</th>
<th>Dry</th>
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<table>
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<th>Bonus Points</th>
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Phase I: Pre-assessment
Phase II: Implementation

### Pre-assessment Score: 68.5

#### Water Efficiency
- Install Aeration - 3 pts
- Buy Biodegradable soap - 2 pts
- Discuss washing habits w/ lab - 1 pt

- Discuss Full batch Autoclaving with lab - 4 pts
- Only use ice you need or return it after use - 2 pts

#### Cold Storage
- ULT set to 70c - 35 pts
- Freezer Inventory - 10 pts
- Shar Freezer space - 5 pts

- Eliminate all old samples - 2.5 pts
- Defrost all freezers - 10 pts

#### Energy Efficiency
- Shut the Sash stickers on the hoods - 5 pts
- Power saving mode for equipment - 10 pts

- Plug all equipment into power strips for easy "unplug" at the end of the day - 2 pts

#### Waste Management
- Recycle gloves - 10 pts
- Create material inventory - 5 pts
- Make some single to multi use changes - 10 pts

- Sustainable printing - 2 pts
- Bring your own mugs/lunch - 4 pts

#### Bonus
- Join the international freezer challenge
- Buy towels to replace some paper towel usage
- Energy reduction (based on monitors)
- Make Green Chemistry switches
- Reuse tip boxes
- Get rid of office mini-fridge

- Scratch paper drawer
- Mini-agarose gels
- Reuse falcon tubes
- Rechargeable batteries
- EH&S Biohazard Incineration
- Donate to Chemcycle
- Compost plant material
- Other: __________

### Scoring

- Water Efficiency: 6/20
- Cold Storage: 7.5/70
- Energy Efficiency: 19/40
- Waste Management: 40/70
- Bonus: 4/20
Phase III: Certification
Resources
Glove Recycling Program Overview

**Purchase Bins**

The R³ Green Labs team will purchase the bins needed to ship the gloves to KC. EH&S will assist in storing these bins in a secure place.

**Distribute Recycling Cans**

After the R³ Green Labs team certifies a lab, they will be eligible to participate in the recycling program. Recycling cans (along with boxes of gloves) will be distributed within the lab to initiate participation.

**Collect Gloves**

Each week, a group of undergraduates will go around the certified labs and collect the gloves from each can. Then, the gloves are transported to EH&S where the collection bins are located.

**Ship Collection Bins**

At the end of each quarter (including summer), EH&S will ship the collection bins to KC. We will receive a report after each shipment describing our conservation impact (i.e., pounds diverted from landfill).
Garments and gloves are worn in the customer’s facility.

Used products are collected and shipped to our recycling centers.

Used products are sorted and processed into plastic pellets or nitrile powder.

Materials are molded into new eco-responsible plastic products and durable goods.
Incentives
MRB: Case Study
MRB LEED Philosophy: A Top Down Approach

PHILOSOPHY
This Building is planned, Designed and built to inspire creativity, and collaboration while using natural resources wisely now and into the future

LIGHT
80% sun lit; saving 54% of lighting energy needs

AIR
Improved air quality through 30% increase in ventilation

ENERGY
Saves 45% Energy
Is a top down approaches enough?

- Energy Efficiency ✓
- Waste Management ✓
- Improved Employee Health ✓
- Cold Storage Management ×
- Awareness and Cultural Changes ×
- Educate ×

and Satisfaction
Green Labs and LEED: A Top Down and Bottom Up Approach to Sustainability

- ✔ Energy Efficiency
- ✔ Waste Management
- ✔ Improved Employee Health and Satisfaction
- ✔ Cold Storage Management
- ✔ Awareness and Cultural Changes
- ✔ Educate
Future Directions

1. Green Labs Full time staff
2. Follow UC Sustainability Policy
3. Incorporating Lab 21 [https://www.i2sl.org/resources/toolkit.html](https://www.i2sl.org/resources/toolkit.html) at UCR
4. Learning from best practices from other Universities
5. Gradually and systematically certify labs and enhance continuous sustainability culture
Sources

- https://www.biocompare.com/Bench-Tips/343367-Ultralow-Freezer-Preventive-Maintenance/
- https://www.mygreenlab.org/inventory-management.html
- https://california.gofoam.org