

Why sustainability matters in the lab

Lab work has a significant impact on the environment, ranging from energy and resource consumption to chemical and equipment use and disposal.

Most researchers aren't aware where the bulk of energy is consumed or how to curb usage. Sharing how and where energy is consumed can empower lab users to optimise methods while reducing wastage and inefficiencies wherever possible - saving more money for science! This document is intended to be an introduction to reducing environmental impacts in ways that can improve science.

“ Labs often use 3-5x more energy than other academic buildings, and yet we rarely address how that energy is consumed.”

Peter James, Director, S-Labs

Questions?

Contact our Laboratories Facilitator
Andrew.Arnett@ed.ac.uk

www.ed.ac.uk/about/sustainability/be/laboratories

First steps to a safer, more sustainable lab

- 1 **Close your fume hood sash** when not in use. Often they're the *largest* consumers of energy!
- 2 **Manage your chemicals**
Use/order appropriate quantities, and check
- availability of the chemical in neighbouring labs
- chemical waste is disposed of correctly
- 3 **Manage your freezers**
Ensure the contents of your freezers are well managed, and the freezers are well maintained and defrosted. Don't leave the freezer door open longer than necessary, and consider running -80°C freezers warmer at -70°C (25-30% energy savings).
- 4 **Purchase energy and water efficient equipment**
- 5 **Power down wherever possible**, particularly on weekends and at night.
- 6 **Be conscious of what you use and why**
Plan experiments to avoid repeats, use appropriate amounts, and avoid unnecessary usage of disposable items.
- 7 **Recycle/re-use** wherever possible. This can be through sharing, appropriate disposal, and even resale.

Key Principles

Chemicals and materials Are they being stored safely and used efficiently?

Waste and recycling Is hazardous or special waste being minimised? Are materials and equipment being re-used or recycled efficiently?

Management and training Does the lab have a responsibility structure for environmental improvement? Are users aware of the importance of energy and environmental issues?

Cold storage Is your freezer full of non-essential or unlabelled samples? Has your freezer been defrosted and is it running well?

Scientific equipment Is it being used efficiently? Are students being made aware of why equipment is energy intensive and the different ways it can cost a lab?

Lighting Is the lighting appropriate to user requirements and always turned off when not required?

Fume cupboards Are the fume-hood sashes kept closed whenever possible? Are they turned off at the end of the day (whenever possible)?

Water Is it being used efficiently and recirculated wherever possible? Purified water should be used appropriately, while a running tap should be used sparingly for stainings and glassware cleaned by soaking (which is most effective).

Advice for demonstrators

Lab work has a significant impact the environment planet, ranging from energy and resource consumption to chemical and equipment use and disposal.

As a demonstrator, you have a unique opportunity to teach students the best ways to keep our laboratories safe whilst ensuring that chemicals and kit are utilised efficiently.

Advising students of how and where energy is consumed enables them to optimise their methods, and to reduce wastage and inefficiencies - saving more money for science.

Key Principles

Chemicals and materials Are they being stored safely and used efficiently?

Waste and recycling Is hazardous or special waste being minimised? Are materials and equipment being re-used or recycled efficiently?

Management and training Are students aware of the importance of energy and environmental issues and of who is responsible for such aspects of the lab?

Cold storage Draw your students attention to the importance of effective labelling, as well as sample management (avoiding clutter and ice build up).

Scientific equipment Is it being used efficiently? Are students being made aware of why equipment is energy intensive and the different ways it can cost a lab?

Lighting Is the lighting appropriate to user requirements and always turned off when not required?

Fume cupboards Often the largest consumers of energy! Are the fumehood sashes kept closed whenever possible? Are they turned off at the end of the day (whenever possible)?

Water Is purified water being used efficiently, and recirculated wherever possible? Glassware cleaning should be done by soaking instead of letting the tap run.

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Peter James, Director, S-Labs

Questions?

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Andrew.Arnott@ed.ac.uk

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First steps to a safer, more sustainable lab

1 Fume hoods can use as much energy as the average home! Discuss keeping sashes closed and the differences between variable and fixed flow hoods.

2 Discuss how chemicals are managed Are appropriate quantities being used? Is the same chemical available elsewhere? Are chemicals disposed of correctly?

3 Check & question freezer management Are they defrosted and well maintained (clean filters)? Are alternative storage temperatures or methods promoted?

4 Scientific equipment Discuss and question energy consumption, as well as opportunities to power down and share.

5 Explain and question what is used and why Are experiments planned to avoid repeats? Are sterile plastics appropriately used only for experiments?

6 Reduce, Reuse, Recycle wherever possible. This can be through sharing and appropriate disposal, as well as novel solutions for your teaching experiments.