

# THE LAB CYCLE



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## SCIENCE SPEAKS

### Optimizing Lab Operations for a Greener Future

Manufacturing facilities and laboratories usually require high energy consumption which results in increased carbon emissions. Based on studies, pharmaceutical companies produce 55% more carbon footprint than the automotive industry, and the healthcare sector alone comprises 4.4% of the greenhouse gas emissions worldwide. *Continue at page 2.*

## IN THE BLUELIGHT

### Plant Genebanking: Investing Seeds for the Future

For many years, the agricultural sector has worked on the continuous development of sustainable practices to provide sufficient food and medicine supply for a growing population. Among the many challenges they aim to resolve are the issues inflicted by plant disease outbreaks and upsurge, pests, and climate change. The conservation and increase of diversity of plant species are recognized feasible solutions to attain sustainability—and this is where genebank plays a part. *Continue at page 4.*

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### Esco Lifesciences Technical Resource Hub is Up!

Aside from providing world-class equipment and services, Esco Lifesciences aims to give a complete customer experience through its very own equipment knowledge base. The goal is to provide accessible materials such as technical papers, safety posters, and videos. *Continue at page 8.*



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# Optimizing Lab Operations for a Greener Future

Manufacturing facilities and laboratories usually require high energy consumption which results in increased carbon emissions. Based on studies, pharmaceutical companies produce 55% more carbon footprint than the automotive industry, and the healthcare sector alone comprises 4.4% of the greenhouse gas emissions worldwide.

Laboratories produce tons of waste yearly. A scientist alone can generate around 1 ton of plastic waste in a year. Common examples of waste from laboratories are gloves, pipette tips, glass bottles, and cardboard boxes, many of which do not go directly to landfills or incinerators. Although recycling can help in waste management, it does not lengthen product life and is not an option for most medical wastes. Adding to the plight is the excessive energy consumption of plug-load equipment such as freezers, incubators, and computers. These units are deemed necessary and cannot be substituted.

To address this pressing concern, scientists and researchers across the globe have taken initiative in their academic institutions or biopharma organizations to arrive at sustainable approaches in research. Green lab efforts continue to increase as researchers work towards reducing energy consumption, water use, and waste production. Below are various practices that researchers can take into account to reduce the collective carbon footprint in laboratories.

## Energy Consumption

1. Turn off or unplug the laboratory equipment that is not in use.
2. Consider energy consumption when purchasing new equipment.
3. Turn off the lights when leaving the room.
4. Keep appliances and frequently used equipment on a routine timer schedule.
5. Clean your equipment regularly.



## Waste Management

1. Properly dispose of hazardous materials.
2. Reduce waste through various disposal methods such as sharing, redistribution, or recycling.
3. Keep a logistical record of equipment to avoid unnecessary purchases.
4. Switch from plastic to glass when possible.
5. Use more environmentally friendly chemicals when possible.



## Water Consumption

1. Choose equipment that are designed with water-conservation features.
2. Wash the labware efficiently.
3. Report dripping and leaking faucets.
4. Install or use timers on critical or continuous water uses.
5. Eliminate single-pass cooling.



## Equipment Efficiency

1. Maintain a cool room temperature to ensure optimal equipment efficiency.
2. Keep door openings as short as possible.
3. Limit the use of UV lights in biosafety cabinets.
4. Clean and decontaminate the equipment regularly.
5. Schedule preventive maintenance and re-certify equipment in compliance with standards.



## Sustainable Procurement

1. Inquire about minimal packaging.
2. Durability and efficiency outweigh the cost of purchase. Consider the cost of the initial purchase as well as the cost of operation and maintenance.
3. Ensure that refrigerants have zero ozone depletion potential.
4. Evaluate the storage requirements. Purchasing a larger unit ahead of time can help avoid making further purchases.
5. Consider whether ducting is required or whether filtration system will suffice. Ducted units will consume more electricity.
6. Upgrade to more energy-efficient equipment.





## Esco Scientific's Sustainable and Green Equipment Solutions

Maximizing productivity while lowering operating expenses is one method to make a laboratory more sustainable. At Esco Scientific, we support by promoting eco-friendly choices and developing high-quality and energy-efficient laboratory equipment.

From our Centrifuges, Orbital Shakers, Ultra-Low Temperature Freezers with environmentally friendly refrigerants and up to our energy-efficient Laminar Flow Cabinets, Ductless Fume Hoods, Biological Safety Cabinets to name a few, we are always looking for ways to make things more sustainable.



SCAN HERE

*Discover more of Esco Scientific's green solutions and environmentally friendly operations.*

It is never too late to take part in this green revolution. As laboratory personnel, scientists, and researchers continuously strive to discover scientific breakthroughs for the advancement of society, one should also remember that it is possible to do so while protecting the environment and the planet that we live in. After all, **we only have one Earth.**



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# Plant Genebanking: Investing Seeds for the Future

For many years, the agricultural sector has worked on the continuous development of sustainable practices to provide sufficient food and medicine supply for a growing population. Among the many challenges they aim to resolve are the issues inflicted by plant disease outbreaks and upsurge, pests, and climate change. The conservation and increase of diversity of plant species are recognized feasible solutions to attain sustainability—and this is where genebank plays a part.

A plant genebank is a type of biorepository that preserves genetic materials from various plants. The banked seedlings, cells, tissues, or other forms that contain genetic information are used by researchers, breeders, and farmers alike for the research and development of crops and medicines. As global climate changes, this approach is vital for plant varieties to withstand unprecedented weather and natural disasters.

## A GLANCE AT GENE BANKING PROCESS



### Registration

After the sample acquisition, a unique identification number is assigned to every material. This allows genebanks to properly manage and document their samples the moment they enter the process up to the time they are distributed.



### Sample Processing

The samples are prepared for conservation wherein methods differ per sample type. Seeds undergo cleaning, drying, moisture content determination, and packing. As for plant materials to be used in tissue culture or cryopreservation, extraction and disinfection are done.



### Germplasm Testing

The seeds' and plant materials' quality are tested to ensure that they are viable and free of pests and diseases.



### Airstream® Gen 3 Horizontal Laminar Flow Cabinet for Plant Tissue Culture

A Horizontal Laminar Flow Cabinet is used to provide sample protection in preparing explants and media for tissue culture.



### HP Series Laboratory Freezer

A Laboratory Freezer preserves and protects samples through a uniformly distributed maintained low temperature.



HF2-1500T\_



### Conservation

There are two types, the *in situ* and *ex situ*. In *in situ*, germplasms are conserved and maintained in their natural habitat. This type is not deemed to be the best option.

On the other hand, *ex situ* conservation offers an efficient and effective solution. Materials are placed under artificial conditions in a controlled environment such as cold storage. Seeds are stored at  $-18^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$  to maintain viability and specially prepared *in vitro* culture samples are stored long-term at  $-196^{\circ}\text{C}$ , usually in liquid nitrogen.



### Characterization

The expression of highly heritable characters ranging from morphological or agronomical features to seed proteins or molecular markers in plant germplasm is determined. This is done by growing a representative number of plants in the field.



### Regeneration

This is done to increase the number of initial samples and replenish stocks. This process is very tedious as it requires careful adherence to special requirements to prevent loss of genetic integrity.



### Distribution

The preserved samples are made available for germplasm users, breeders, researchers, and farmers.

The seeds are investments that are soon to bear the fruits of labor. As the global demands for genebanking continue to increase, it calls for the utilization of engineering controls that are up-to-date and efficient. Taking part in guarding diversity, Esco Scientific innovates its products to help combat undernutrition, discover novel drugs and climate-proof crops, and ultimately, supply food to every table.

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# From Paper to Paper

Paper has a large production rate of around 400 million metric tons annually and is regarded as a highly recyclable material. Commonly, the types of paper that can be recycled are magazines, old newspapers, notebooks, and used envelopes. While other forms like wrapping, corrugated/cardboard, and packaging papers are typically assessed for recycling suitability prior to the process.

Paper recycling eventually reaches the point where heavily shortened fibers may cause the paper to not fit for processing anymore. Aside from this, some sorts like carbon paper, stickers, and those contaminated with food are no longer suitable for recycling.

Recycling is a requisite technique to help in pollution reduction and minimize waste amassing, hence, paper recycling plays a significant role in fostering global sustainability.

## PAPER RECYCLING PROCESS

The paper recycling process can be broken down into 5 general steps:



### 1. COLLECTION

Gathering of used papers requires proper segregation because not all types of paper can be recycled such as wet paper and those contaminated with food, oils, or chemicals.



### 2. TRANSPORTATION AND SORTING

After collection, papers are checked and graded based on quality. It is then transported to the recycling facility where thick types of paper are segregated from thinner ones.



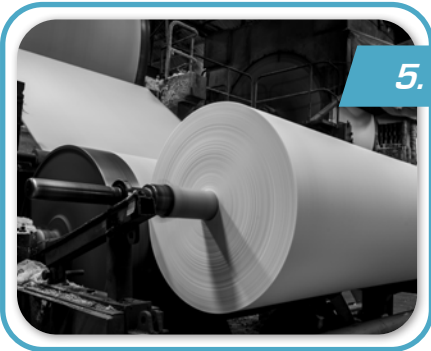
### 3. SHREDDING AND PULPING

Once sorted, papers are sent to the paper mill and shredded into smaller pieces then mixed with water and chemicals to break down the paper into fibers. This mixture is thoroughly strained to remove unwanted materials.



#### 4. DE-INKING

During de-inking, ink particles float leaving a whiter pulp at the bottom of the tank. Chemicals are usually added to aid in the flotation process along with bleaching agents to produce white paper or dye for colored products. Virgin fibers from trees are added to enhance the quality.



#### 5. DRYING

The pulp mixture is passed through rollers that flatten and squeeze out excess water. It is then dried with heated rollers producing a large roll of recycled paper.

## DELIVERING SOLUTIONS THROUGH SAFETY

The pulping and de-inking steps use harmful chemicals such as sodium hydroxide and hydrogen peroxide. Preparing these chemicals for the paper recycling process would require proper equipment that provides operator protection. Esco Lifesciences offers the Frontier® Acela Ducted Fume Hood, a high-performance fume hood designed with maximum safety, performance, and energy efficiency.



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EFA

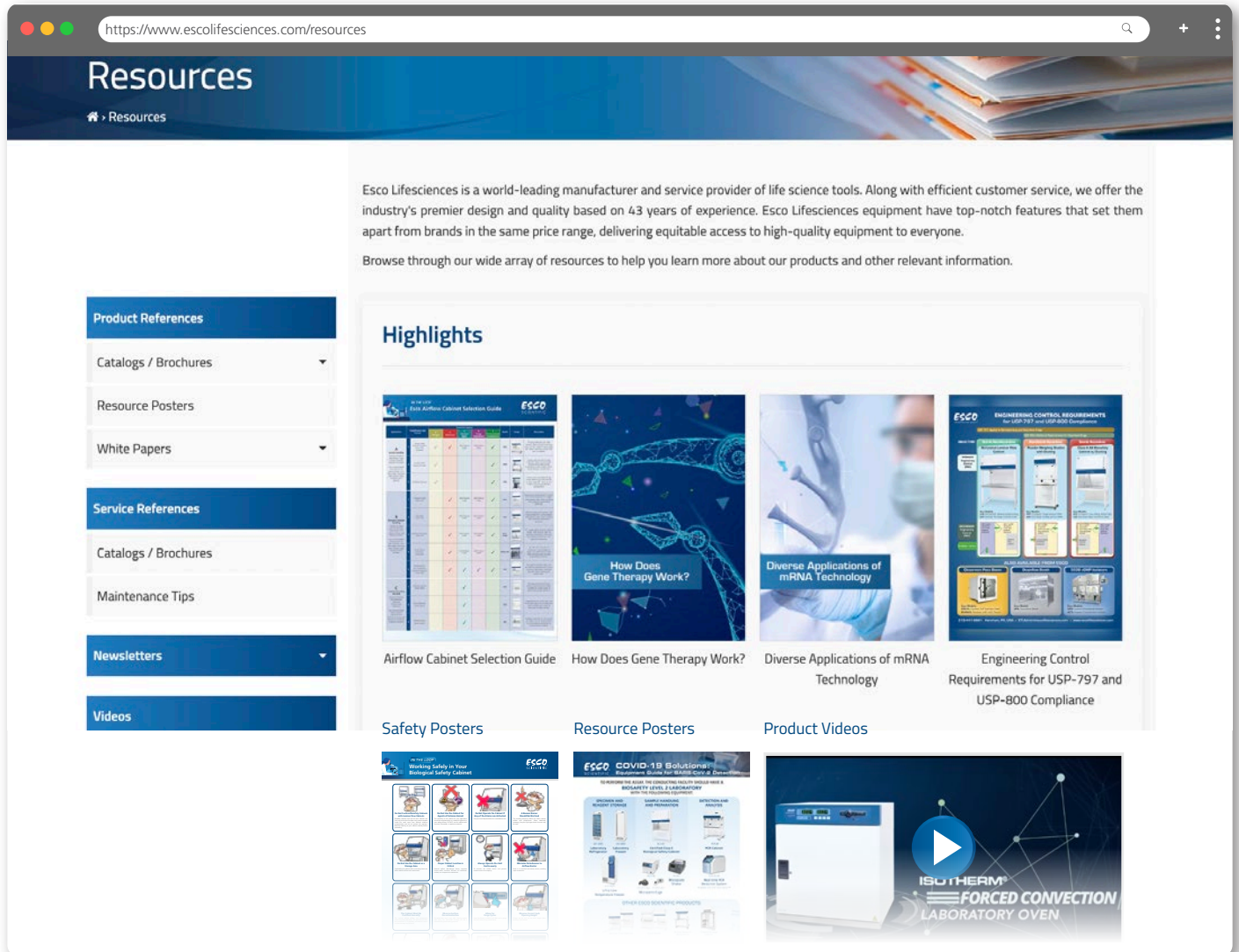
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# Esco Lifesciences Technical Resource Hub is Up

Aside from providing world-class equipment and services, Esco Lifesciences aims to give a complete customer experience through its very own equipment knowledge base. The goal is to provide accessible materials such as technical papers, safety posters, and videos. The resource hub also includes a product-specific guide to models, product must-have features, factors to consider before purchasing the laboratory equipment, and articles on trending product applications.



For ease of use, users may explore the quick buttons to easily access product videos, white papers, newsletters, resource posters, and brochures.

Esco Lifesciences— providing solutions from A to Z.

***DON'T FORGET TO REGISTER ON OUR WEBSITE NOW!***






# The Sustainable Lab Bingo Challenge

Make an impact in the laboratory. You can make a difference and make your laboratory greener by applying at least 3 of the sustainable habits below.

Cross off as you complete. For each item completed, you'll get 1 point.




Use an energy-efficient equipment



Turn off unused lights/ equipment




Install a timer



Shut the sash of the hood to save energy



Walk or bike going to work



Use glassware instead of plastic



Re-use packages and boxes



Reduce water consumption



Properly dispose of wastes and chemicals

How many were you able to cross off? Scan the QR code based on your total accumulated points for a surprise!



1-3 points



4-6 points



7-9 points

Here are the answers to the previous issue's challenge:

## TEST YOUR SAFETY KNOWLEDGE!



BIOHAZARD



TOXIC MATERIAL



FLAMMABLE MATERIAL



EXPLOSIVE MATERIAL



GENERAL WARNING



OXIDIZING MATERIAL



UV LIGHT



LOW TEMPERATURE

