



for Scottsdale Public Library
Makerspace Initiative 2025



RESPONSIBLE MAKERSPACE

Recycling & Limiting Plastic Waste



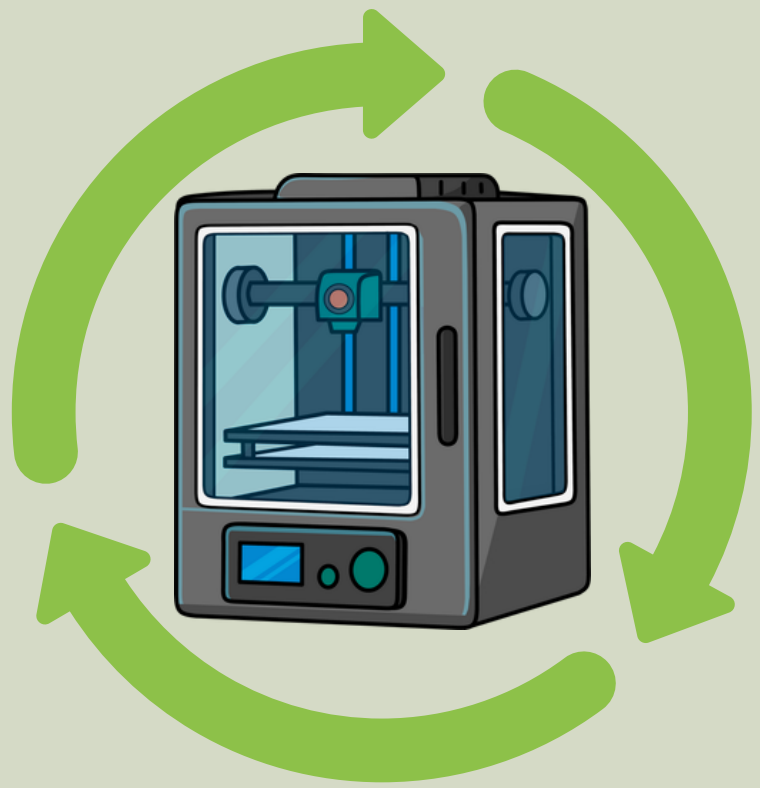
Written By

Charlene Hardin

WHY RECYCLE?

Makerspaces provide many opportunities to reduce, reuse, and recycle, or even up-cycle, items that would otherwise find their way to a landfill. Makerspaces and 3D printers enable the library and community to access tools for maintaining older equipment and manufacturing replacement parts.

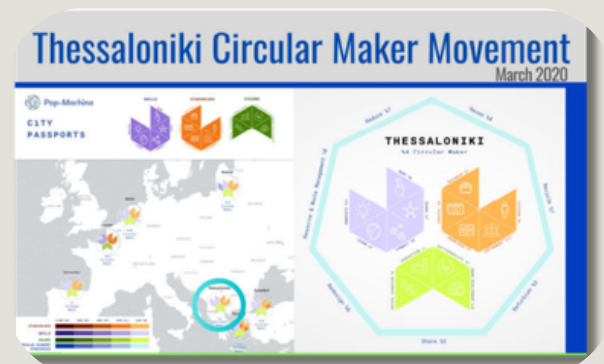
To turn a makerspace into a net win for the environment, it is important to consider potential drawbacks and mitigate waste production through recycling programs and proper training.



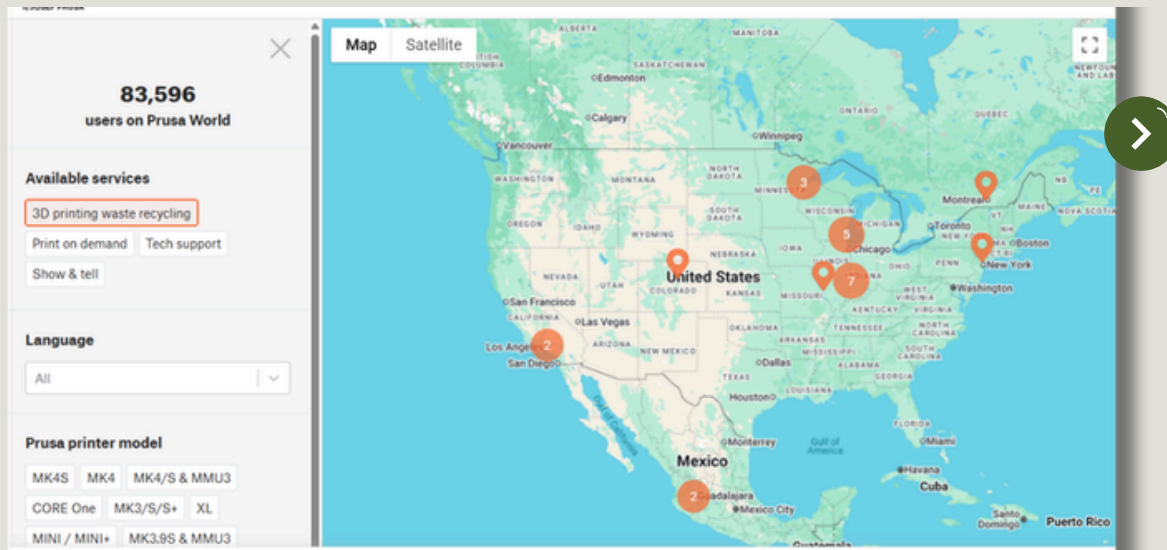
Circular Maker Movement >

From “Mapping the Circular Maker Movement” (www.pop-machina.eu)

The circular maker movement has all the characteristics of the maker movement...[a variety of stakeholders organising initiatives that are part of the supply chain of ‘making’] and additionally promotes sustainability and is more resource-oriented.



This movement, originating in the EU, aims to enhance the circular economy and sustainability of FabLabs, Makerspaces, and hackerspaces that provide 3D printing equipment for both professionals and amateurs. Utilizing the “circular” aspect of this concept could be beneficial as a framework for building programs that reduce the use of new materials and contribute to responsible, eco-conscious space.



Prusa World Interactive Map Showing Recycling Locations for Filament
<https://world.prusa3d.com/>

AVAILABLE RECYCLING PROGRAMS

Prusa offers an interactive map of filament and plastic recycling locations. Many of these companies and organizations only handle local plastic waste. The most likely candidate for a recycling program for Scottsdale Public Library will require staff to collect clean filament for bulk shipment to the recycling company or organization. At the time of writing, Printerior is located in Missouri and presents the most likely solution for filament recycling needs.

Instructions for shipment can be found at the following web address:

<https://printeriordesigns.com/pages/recycling>

BENEFITS

The most obvious benefit is the opportunity to reduce plastic waste associated with additive manufacturing at the makerspace, but there are other benefits as well, including:

- Credits from Printerior for savings on future filament purchases.
- The ability to encourage our community to think about the plastic/product lifecycle and ways to mitigate the impact of personal decisions.
- The ability to reassure stakeholders that SPL's makerspace integrates sustainability into its innovation goals.

LIMITATIONS

- staff will need to install a mechanism for collecting clean PLA filament
- Recycling is generally limited to PLA, PLA+, PETG
- The cost benefit and feasibility of recycling through shipping will need to be continuously evaluated

WHAT IS PLA?

PLA (Polylactic Acid): PLA is a bioplastic derived from renewable resources like cornstarch, sugarcane, and tapioca roots. It is a recyclable material that can be broken down and reused. (3ds.com)



MAKER STATS

Make Community, LLC estimates there are as many as 5,500 makerspaces, hackerspaces, and Fab Labs currently operating throughout the world.

“It is important to note that although PLA is derived from renewable sources, this does not necessarily imply that it is completely biodegradable. PLA also has a low degradation rate with a lifetime of 3–5 years, which may affect the ecological system” - Hasan, et al. (2024)

<https://doi.org/10.1016/j.smse.2024.100020>

Recycled filament, while useable, may have less strength than fresh filament made from virgin material.

Estimates of waste produced by failed prints or multicolor prints represent between **15%-20% of the printer filament usage**. The best options for responsible waste reduction would be to limit multicolor prints and ensure that prints are set up correctly to avoid failed prints in the first place. The “measure twice, cut once” rule could be rephrased as **“slice twice, print once.”** Additionally, to avoid waste, we should consider storing PLA properly. PLA is naturally hygroscopic, and so keeping the material dry (hygrometer reading of **10% or less is ideal, with 40% or above risking moisture absorption that will damage the PLA**).

Recycling, while a feasible option, may have a neutral impact on the budget, considering the time and discounts available; however, it may contribute to positive community support for makerspaces and help promote sustainability in the long term.

Printerior by Numbers:

280 discount points / 1 kg of PLA waste

100 discount points = \$1 off PLA purchase

Printerior prepaid collection box, cost = \$114 for 10 gallon bucket

When condensed, the bucket should hold roughly 47 kg

47 kg = 13,160 points = \$131.60

Total gain for recycling: ~ \$17.60

It may be worthwhile to contact the company to determine potential additional price breaks for libraries.