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GREENLIGHT GREENPAPER

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Our project focuses on developing an innovative system that transforms recycled plastic into high-quality 3D printing filament, enabling us to produce a wide range of products through additive manufacturing techniques.

CREATED BY GREENLIGHT SOLUTIONS STUDENT
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Our Project Partner faced challenges in creating usable plastic filament from recycled materials. The melting and refinement process was time consuming and tedious, and the Project Partner wanted to know what tools could be obtained to automate the process and produce sufficient filament quality. Most challenging, however, was that the machinery was jammed, halting production. These challenges offered us the opportunity to engage in creative thinking to figure out the jamming issue.

As we worked throughout the project cycle more challenges presented themselves in the form of technical roadblocks. The protocyler was jammed, the protocyler's puller was not functioning, the software was incompatible with most of our computers, and the 3D printer was jammed. This brought us the opportunity to tinker with the machinery and learn how to solve technical issues for the Project Partner.

Our goals were to achieve creating **5 spools** of 1 type of plastic before week 12, efficiently use the protocyler to create consistent filament at **1.75 mm**, organize **1** document that provides necessary information about the protocyler and its operations, research for **5** hours on plastics and protocyler usage, and print **25** educational toys to donate with the recycled filament. However, we were only able to accomplish our research and the document due to the technical issues that arose. In addition, we made 5 prints, but could not print with recycled filament.

To address the protocyler jam, we implemented preventive measures such as closely monitoring the plastic input and ensuring its consistency. For the non-functioning puller in the protocyler, we recommend inspecting and repairing the mechanism. To tackle the software issues, we collaborated with software engineers to debug the program, update the firmware, and fine-tune the settings for precise control and calibration of the 3D printing process. As for the 3D printer head jam, we recommend developing a routine maintenance schedule that involves regular cleaning and maintenance of the extruder head, as well as implementing filament filters to prevent debris from causing future jams.

BENEFITS TO PROJECT PARTNER

- Gives life to plastic that would otherwise be thrown away
- Helps with recycling initiatives
- Can create products that could be used in business

BENEFITS TO SOLUTIONEERS

- Benefits students with the products that may be created
- Gives students opportunity for hands-on machine and plastic experience

BENEFITS TO THE COMMUNITY

- Benefits community by helping to create a more circular economy
- Helps to mitigate waste and create new items
- Creates products that could be useful
- Has potential to create jobs

