“3D Procycling Team”

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Project Summary

Our goal for this project is save money by establishing a process for recycling old 3D printed PLA such as rafts, support material and failed prints, and forming it into rolls of new filament using the Re De Tec- Procycler+ system.
By establishing a recycling program for the school division, our team can encourage younger students to recycle material to help improve the environment.

The Challenge(s):

- Obtain funding to purchase the Re-De-Tech Recycler+.
- Establish a procedure for collecting the old PLA 3D printing material that would normally go into the local trash stream.
- Developing a fun workshop for elementary school students about recycling.

Project Goals

- Identify the criteria and constraints of the project.
  - Criteria to be met.

    1. Establish the process for collecting the material to be recycled.

    2. Educate the elementary school age students on the benefits of recycling.

    3. Obtain funding for the Procycler + system from the Office of Technical and Career Education.

Criteria and Constraints

- Constraint's of the project:
  - The process is limited to only materials that can be successfully recycled into 3D printing filament, aka PLA and ABS.
  - The process will be limited to schools within the Virginia Beach school system.
  - Funding for the project will be limited to budgeted funds from the Office of Technical and Career Education and/or donations from local business.
  - What are the types of materials that the Procycler can utilize?
  - Costs to students picking up material to be recycled.

Brainstorm possible solutions

- Research possible grants from companies to obtain funding for material/equipment purchases.
- What are the various type of plastics that are currently going into the local trash stream?
- Include an overview of the various recycling codes being used by manufacturers into the presentation to the elementary students.
- Develop a Go-fund-Me project for materials needed.
- Obtain input from elementary students on how to improve the process, once established.

Generate Ideas

- Have students from the Advanced Technology Center Engineering classes pickup the material from the various Virginia Beach Schools.
- Have the schools deliver the material to be recycled to the Advanced Technology Center.
- Establish a goal for schools to obtain new material based on the amount of material they recycle.

Explore Possibilities

- Tie the project into energy education lessons within the middle and high school Engineering classrooms.
- Contact the various curriculum coordinators within Virginia Beach about presenting the project to their teachers.

Select an approach

- Model the project this year for other high schools looking for innovative ways teach recycling to younger students.
- Possible display opportunities for Elementary and Middle School Science Nights throughout the school division.

Build a Prototype System

- Begin design, and establishment of the process as per the identified goals.
  - Establish a presentation schedule with interested elementary schools.
  - Design the presentation to be given to the elementary school students.
  - Establish the pickup and delivery process for the schools to send the material to the Advanced Technology Center.

Refine the Design

- Initial design of the process was to heavily based on the high school students from the ATC picking up the material from the schools.
- The process was updated to require the schools to deliver the material to the Advanced Technology Center in return for new recycled filament.

Refine the Design

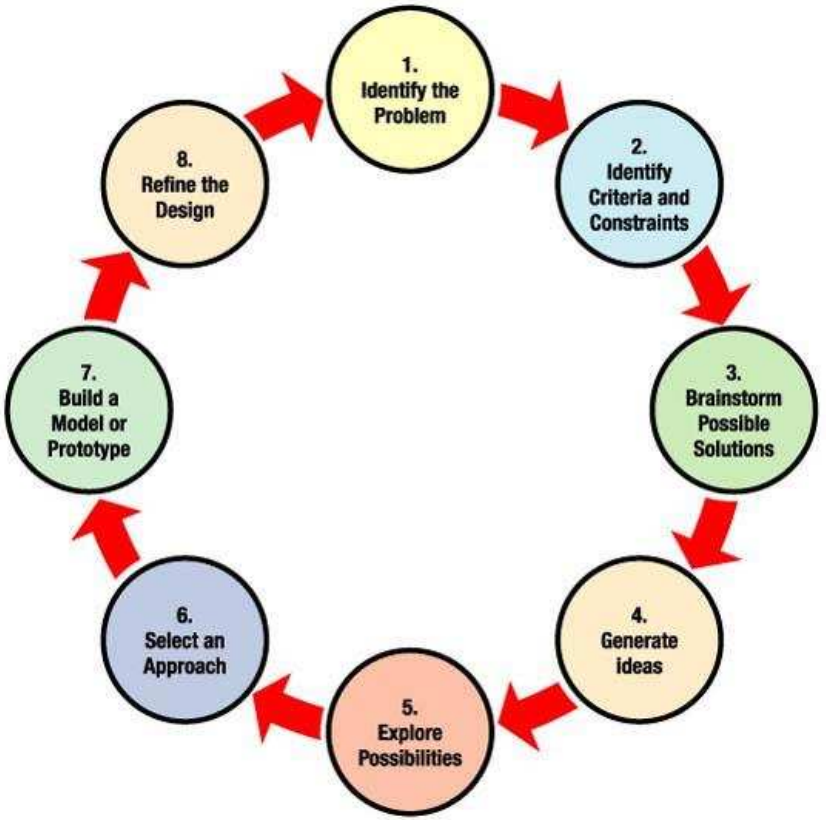
- Determine other equipment types that will recycle plastics for use in additional equipment, such as injection molders, vacuum formers, etc.
- Expand the material to be collected to include other plastic material, such as food containers, soda bottles, etc.
- Expand the recycling process to include sending non-3D printing materials to a local recycling center.

Evaluation of the Project

- During the final “Shake Down”, the following items were assessed:
  - Were the original goals of the project met?
  - Did the project provide ties to Elementary, Middle and High School Science curriculum?
  - Were the prototype processes documented?,
  - How did the project interact with the community?
  - Does the project provide avenues for research into alternative energies?

Overall Observations

- The project adapted the NASA Engineering Design model,



Recommendations/Improvements Needed

- Improvements could include:
  - General
    - Additional curriculum materials/lessons need to be developed for implementation into classrooms at all levels,
    - Research Sponsorships to offset equipment and material costs,
  - Project Specific
    - Additional safety procedures for hazard awareness,
    - Sound system for announcements at public events,