

# Recycling Plastic for 3d Printing

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3d printing is becoming more important and useful every year. Almost every single engineering company uses 3d printing in some way. Despite this many schools don't have 3d printers. This is because historically 3d printers have been very expensive. The price of the machines has been falling every year, with great printers like the Creality Ender 3 selling for only \$200. The printers may be getting cheaper but the filament is as expensive as it's always been. With a kg of PLA going for \$20 over time the amount of filament used in a classroom adds up quickly. The prototype combats this by taking any failed print or supports and plastic water bottles. The design was based on the industrial extruders used by commercial filament producers. The prototype was constructed the testing began. To hone the prototype so it could produce a continuous 1.75 mm filament stream, the prototype was turned on and ran. After 1 meter of the filament was produced the prototype was stopped. Then the filament is measured by calipers, and the speed of the motor is adjusted accordingly. Then the whole process is repeated until the prototype is constantly producing 1.75 mm diameter filament. The prototype is currently producing long lengths of filament, but the diameter of the filament is not very consistent. If I was to continue this project I would make a better cooling system for the filament, a better main drive motor, and a faster puller.

## **Awards Won:**

Fourth Award of \$500

NC State College of Engineering: Alternates