3D Printed Educational and Promotional STEM Puzzles

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Abstract

We designed and 3D printed various novelty items to make physics and sciences more interesting to students considering STEM (Science, Technology, Mathematics, and Engineering) fields and promote YSU. The use of additive manufacturing made mass production of these items cost effective. There were various difficulties encountered throughout the project, however these were able to be worked around.

Purpose

- Mass produce cheap STEM toys to be given away
- Introduce STEM fields to the community in a fun creative way
- 3D printing - most cost effective way

Method

- Design toys geared towards various STEM principles via readily available software, i.e. Fusion 360 and SolidWorks
- Utilized 3D printer to produce a high volume

Figure 1. MakerBot Replicator 2, Desktop 3D Printer

Results

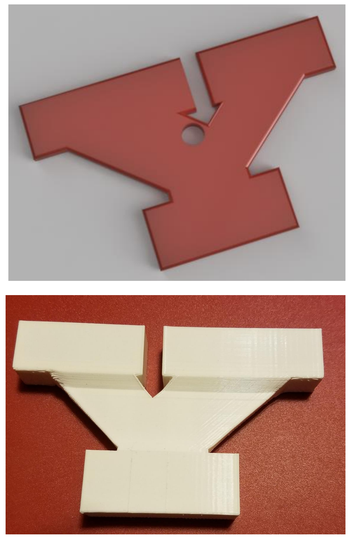

Figure 2. Y-shaped spinner: design prototype (top) and 3D printed (bottom)

Figure 3. Spinner toy with "STEM" letters: front of spinner (top left), back of spinner (top right) which has two holes to hold two nickels each as weight, and first physical prototype (bottom).

Some challenges we encountered:

- some STEM puzzles and toys are already made of clear plastic - not feasible via 3D printing
- difficult to change densities of the materials while printing balancing toys-further adjustment needed
- Spinners required a specific sized bearing that had to be coordinated while designing

Conclusions

We found an efficient method to mass produce a promotional product to hand out. We also learned about the capabilities of 3D printing weight allowance and how much force it can withstand without breaking. Future challenges are making adjustments to the balancing toys due to 3D printing limitations and developing more complicated and challenging STEM toys. Additionally, we will try developing fidget toys with STEM and YSU themes.

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