April, 2025
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Design Rationale

Introduction

For this project, our task was to complete the process of adapting an electric battery powered water gun by allowing for it to be controlled through a 3.5mm switch. The purpose for this final product was to create a water gun that could be operated with the push of a button as the triggering of a traditional water gun may not be possible for people with limited mobility. In addition we created a stand which allowed for the water gun to be used without the need to be held up. The stand we created can rotate to allow for more aim from the user as well.

Requirements

Goal 1: Switch adapt a water gun
Goal 2: Design a 3D printed stand for the water gun

Function Requirement: The water gun can be adapted to work using a 3.5mm switch

Ideation

The water gun presented to us uses batteries instead of a pump to spray water. The plan for this adapted water gun is for the switch to work in parallel with the existing trigger. This way, the water gun can either be activated using the traditional trigger or the attached switch.

Conceptual Design

Since a version of this project has been completed previously, the task was set before us to adapt the water gun so it is able to work in parallel. We placed more of our time and resources into the design for the stand of the water gun as well as the design for the switches created.

The water gun stand was created with the intention to allow the user to use the water gun without requiring them to hold up the water gun while using it. Originally our design intended to replace the water tank attached to the water gun however due to time constraints, that idea was not able to be fully printed and tested. We then pivoted towards a design which held the water gun stable through supporting the barrel of the gun as well as a longer track which would hold the circular water tank. Some adjustments were needed following printing which allowed for the water gun to be stable through the addition of restraints along the back track as well as a center screw which allowed for the stand to pivot on a larger wooden surface.

The switches were created for a switch request through Makers Making Change therefore our designs centered around the user’s requests so they contained numbers as well as musical symbols.

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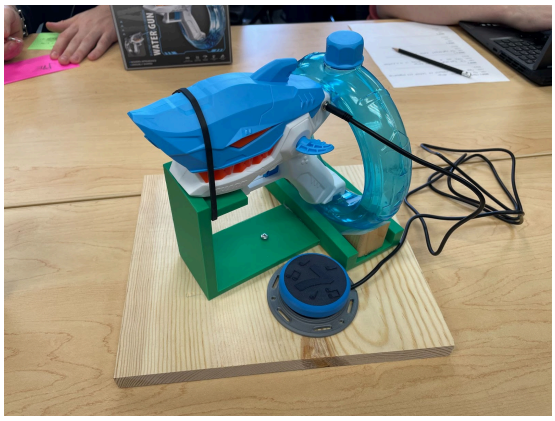
Detailed Design



This is the switch adapted water gun. It was adapted so the switch ran in parallel to the battery circuit allowing for the water gun to be used as originally designed with the trigger or adapted with a 3.5mm switch.

Testing

The water gun was tested by pressing the trigger to make sure the original circuit was functioning as well as by plugging in a 3.5mm switch.

Opportunities for Improvement

The next version of the 3D printed stand could have the addition of braces on either side of the barrel of the water gun to eliminate the need for a rubber band to secure the water gun. The 3D model could also be adjusted so the triangular wooden pieces attached to the track which holds the water tank could be built into the model so the user would not have to make that adjustment themselves.