

TRANSITION DOCUMENT

The Catalyst team has been tasked with designing an interactive model that demonstrates how catalyst work. This project will be used to explain what a catalyst does to middle school students at outreach events.

This semester we worked on creating the final model of the project. We used the partially built prototype from last semester as a starting point and evaluated it to be able to effectively start the final model. We drew many sketches to help demonstrate our ideas. We then started working on the construction aspect of the project. A CAD model was designed and was used to laser cut wood for the box. The pieces were then stained and glued together, and an EPICS sticker was added. The based pieces of the model were also printed. The electrical design of the model was also started but was not completed. We also added an educational aspect to the project, to help further explain our concept.

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CURRENT PROJECT STATUS

Prototype

- Wooden Box
 - Wood base was cut
 - Wood panels were cut and glued with wood glue
 - One panel was attached with a hinge so it can be opened
- Foam Wall
 - Wall was cut and spray painted
 - A hole was drilled across the bottom of the wall for the rod/lever
- 3-D printed rod
 - Printed in 2 pieces, super glued together
- 3-D printed bases

- Reprinted a couple times and then sanded in order to fit the wooden box
- Wooden stabilizers were cut and then attached to the bottom of the bases and the box in order for the bases to stay in place
- Wooden Launcher
 - Wood pieces were cut and then attached together with wood glue
 - Spring and rod have yet to be attached to the system

Final Product

- Wooden Box
 - New box was designed in CAD
 - Laser cut at Bechtal
 - Stained
 - Assembled with wood glue
 - EPICS sticker was added to the front
- 3-D printed bases
 - Redesigned to fit in the larger box
 - Printed through the EPICS lab
 - Glued together using superglue
- Electrical System
 - Designed circuit for box, powers both a set of buttons (controlling either catalyst or no catalyst) and a motor
 - Supplies bought from Amazon or found in EPICS lab
 - Action items:
 - Create way to power both motor and buttons on same power source, as the motor requires 6 V but the buttons both can only handle 5 V. Also, find way to divert current drawn by the motor using a diode to avoid damaging the diodes
 - Implement and test microswitch matrix, and test scissor lift and motor biasing
- Educational Poster – Supplement to box
 - Designed in Canva
 - Definition, example, visual aid, and our box included on poster
 - The design is ready to be printed, but no physical copy yet

For weekly updates of progress from Fall 2021 see Teams > EPICS CED > Files > Archives > Catalyst > Catalyst Weekly Updates

CURRENT SEMESTER PROJECT TIMELINE

- For next semester, focus on:
 - Design a ball return system
 - Finish the electrical system
 - Glue the 3-D bases to the box
 - Glue the acrylic and wood together
 - Design and assemble a new slingshot (use prototype examples)
 - Do product testing

The Catalyst team should plan on finishing the final product and conduct testing. Once testing has been completed, the design should be evaluated by CISTAR.

TRANSITION INFORMATION

- Location of items
 - All if the CAD models can be found in the Fall 2021 catalyst folder on teams.
- Milestones completed
 - We are halfway complete with the final model.
 - All the CAD files currently print the correct dimensions for the size the model is currently.
 - We have the entire wooden base built, which is the final professional model. It was stained and glued together. An EPICS sticker was also added to the box.
- Roadblocks
 - Do not have a definitive plan on how we are going to complete the ball return. We plan on using a pipe to have the balls return in but need to work out the details.
 - The electrical system is not completely done. The rest of the schematic needs to be finished.
- Suggested next steps
 - Finish electrical system
 - Design and do ball return system
 - Find a material to make the wall out of
 - Put it all together
- Design ideas
 - Our past design review slides as well as the design document is a great place to start to get more information on the project. There are a number of sketches as well as pictures of the current progress that has been completed within those documents.
 - They can be found on teams.