

**Engineering Machine
Design Contest Journal**

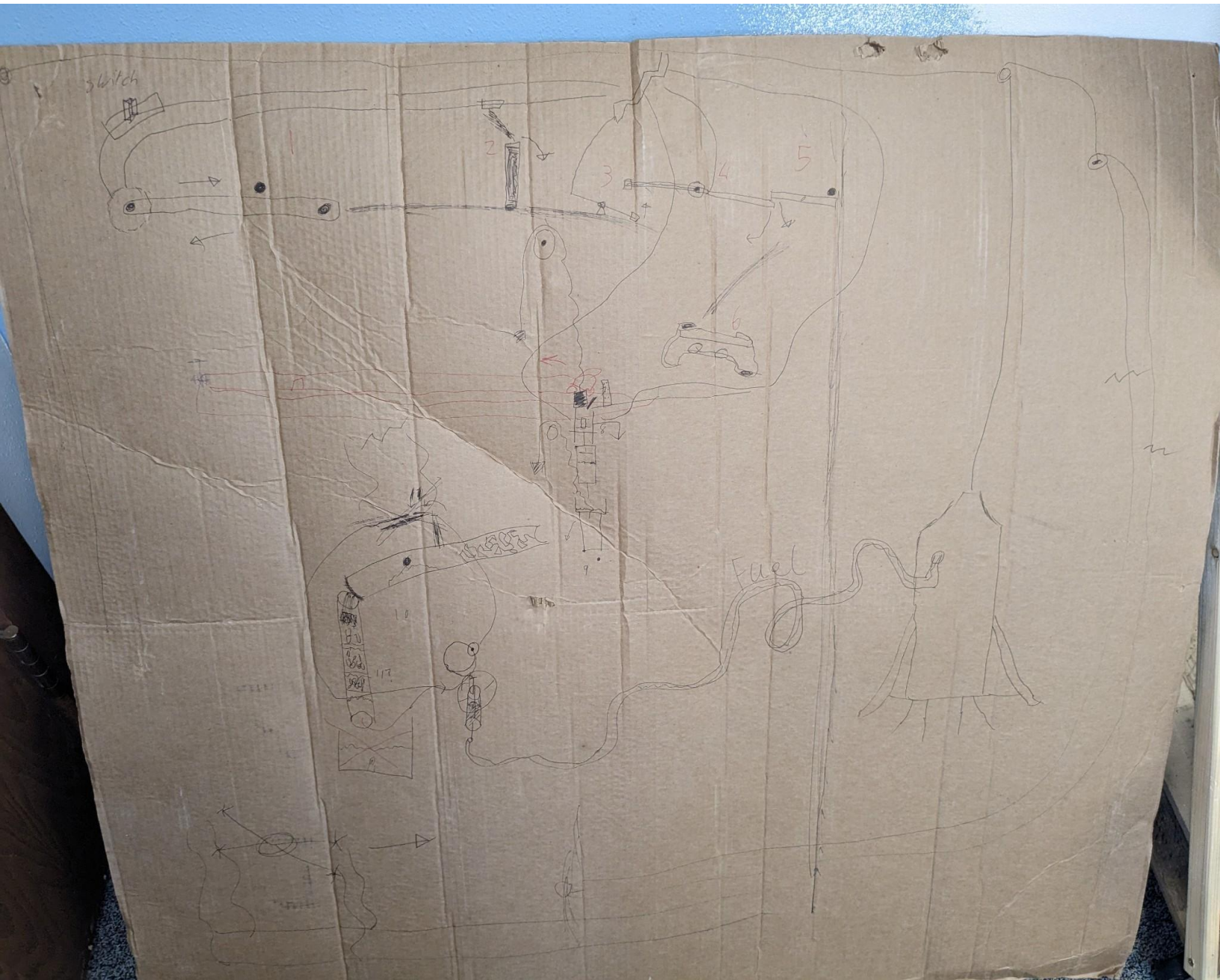
Apollo 11

Wildlands School

Logan, Wyatt, Andrew

**Andrew Johnson, Alexa
Schroeder**

Planned Machine Design Sketch and Description



We consider the, “original” design to be the sketch on the cardboard we made as this is the most we have designed. There was a few drawing of different step ideas, but we didn’t really use any of them. This cardboard template is what we used the whole time and referenced when working. We kept mostly to the planned design but there were a few things changed like the conveyer, filter, and bucket.

List of Machine Steps

Step One Marbles are dropped and knock dominos of platform that pull a string that pulls up a lever

Step Two. Lever contacts another platform and transfers electricity to a motor

Step Three. Motor spins and drops a platform and a marble rolls off

Step Four. Marble hits another marble inside PS controller

Step Five. Marble Makes a closed electrical circuit

Step Six. Motor pushes syringe plunger down

Step Seven. Water flows out of syringe and tips container

Step Eight. Water flows down track and pushes a marble

Step Nine. Marble hits lever and closes an electrical Circuit

Step Ten. Water gets dyed yellow and empties into a container

Step Eleven. Pump pushes dyed water to rocket platform (From the water circuit)

Step Twelve. Motor is activated (From the water circuit)

Step Thirteen. Rocket is pulled up

*Some steps may be different in final result

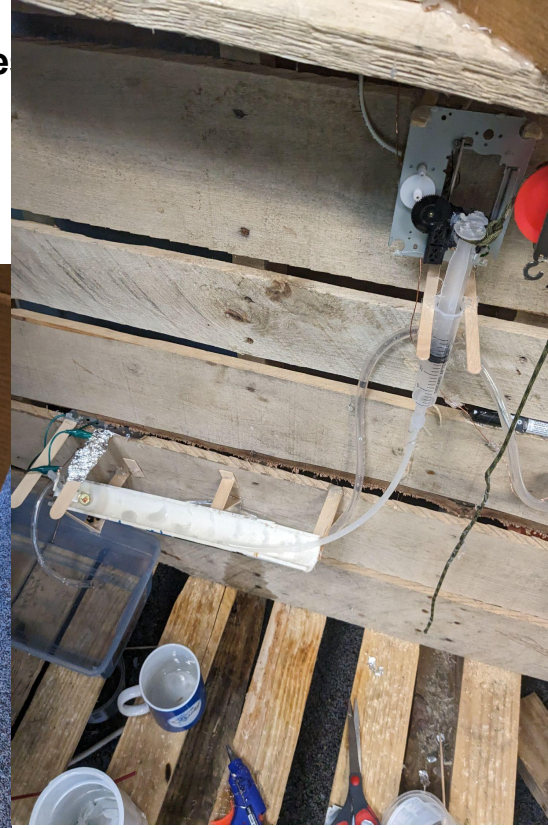
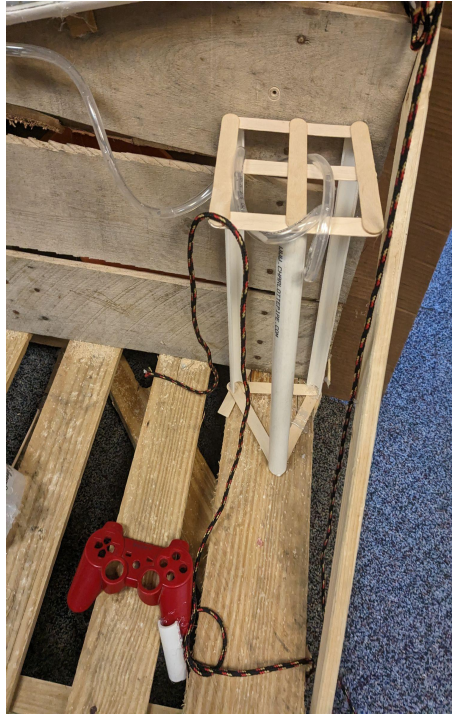
Cost of Machine and Percent of Recycled Materials Used

Item	Cost
Syringe	\$2.50
CD Player/RC Car/ Playstation Parts	Recycled
Wood Palettes	Donated
Aluminium Foil	Recycled
Batteries	Donated
Wire/Tubing	Recycled
PVC	Recycled
Water Pump	\$25
Various Tools	Brought From Home

\$27.50 Spent

~95% Recycled/Repurposed

Applied STEM Processes



1. The domino falling step was especially tricky because the finicky nature of gravity steps. Getting the right idea of you to turn a marble rolling into getting the see-saw wire was difficult. 2. We had to mold the PS controller since the marble was too big to be hit. 3. Making a reliable activation for the syringe from a marble was one of our hardest steps. Luckily, we were able to figure it out through trial and error. 4. Having enough water to go through the pump AND coloring it was kinda difficult. We managed to find a solution though. 5. Having the rocket fly away after being, "Fueled" was also fairly tricky. Also powering both from one step required a lot of brainstorming.

Reflection

Logan's reflection

This years Engineering project was a little chaotic. There were alot of steps added to this project by our school that made it alot more challenging. Are group was not as focused as we should have been until we got close to the dead line. I think we did a pretty good with the planning section of the project. If would have been more focused we could have made a much better project. I think our group worked quite well together. During this project I learned a lot about electricity and what you can do with it. I also learned a lot about designing things and problem solving. With what I've learned from this project I think I could be some sort of designer. One of our biggest challenges was getting our steps to work consistently. Another challenge was designing our Rube Goldberg machine.

Wyatt's reflection

This engineering project has given me mixed feelings. One the one hand, This project was very fun and challenging, as well as being very teaching. It made me think outside the box in a way that was accepted with the group. But on the other hand, it didn't go anything close to smoothly. While some things were our fault, (Like not focusing or not being able to decide what's next), the project just felt poorly planned in general. Misleading deadlines, out of context assignments, spring break in the dead center of the building phase. All of these things felt out of our hands and just happening to us, instead of helping us. This isn't to say that things felt impossible or undoable. We managed to focus up when it mattered and get things done. We drew out a solid plan on cardboard that guided us and helped us get a clearer vision of the machine. We gathered essential materials and set to work. Some things didn't go as planned, while some things all went according to it. Being able to preserve, adapt, and think as a team was the leading factor that let us be able to come as far as we have.

Andrew's reflection

This was my second time competing in this competition. Last year my team made it to the championship but we didn't win anything. I have had a fun time with this project and I hope to create more machines and build things in the future. Now that I look back on last year I think that we will do even better this year. I set higher expectations for myself this time and tried to use last year as an example of what to do and what not to do this year. I hope we will make it to the championship this year, as well as seeing improvement from last year. This project has helped me become better and closer with my friends. This was a fun but hard working few weeks but I think it will pay off in more than one way.

Word Count

490

Bibliography

<https://www.h2odistributors.com/pages/info/how-to-make-a-water-filter.asp>

-This is a website about making a homemade water filter. We didn't end up using it, but it was apart of our plan for a while.

David Tegtmeier

One of our group member's father who helped with some of the electrical steps.

Mr.Betz

Also helped with electrical steps

<https://www.power-sonic.com/blog/how-to-connect-batteries-in-series-and-parallel/#:~:text=To%20connect%20a%20group%20of,until%20all%20batteries%20are%20connected>

This website helped us learn how to wire a battery in series to increase voltage for our pump.

Diary of building process, photos, team biography, etc

https://docs.google.com/document/d/1newy4oKYeh_casbwhhDKmFAw9aFNJ4g1MMJVR10eJwQ/edit

Final Machine Design & Step Explanation



1. Starting step: rolling a marble
2. Marble hits a domino weight that falls off
3. Weight lifts the end of lever wire into complete circuit
4. Motor activates and spins
5. Plank with marble falls and drops marble
6. Marble drops into PS controller and hits tin foil marble
7. Metal marble rolls onto metal track and completes circuit
8. Motor activates
9. Motor pushes syringe down and lifts bucket, dumping water
10. Water rolls marble on track
11. Marble hits lever that completes circuit.
12. Water falls through pipe, coloring it and gets pumped to rocket
13. Rocket lifts off from ground (Same circuit as pump)

There are some things not in picture but will be in final design