Journal

Space Rubber Ducks

Neillsville School

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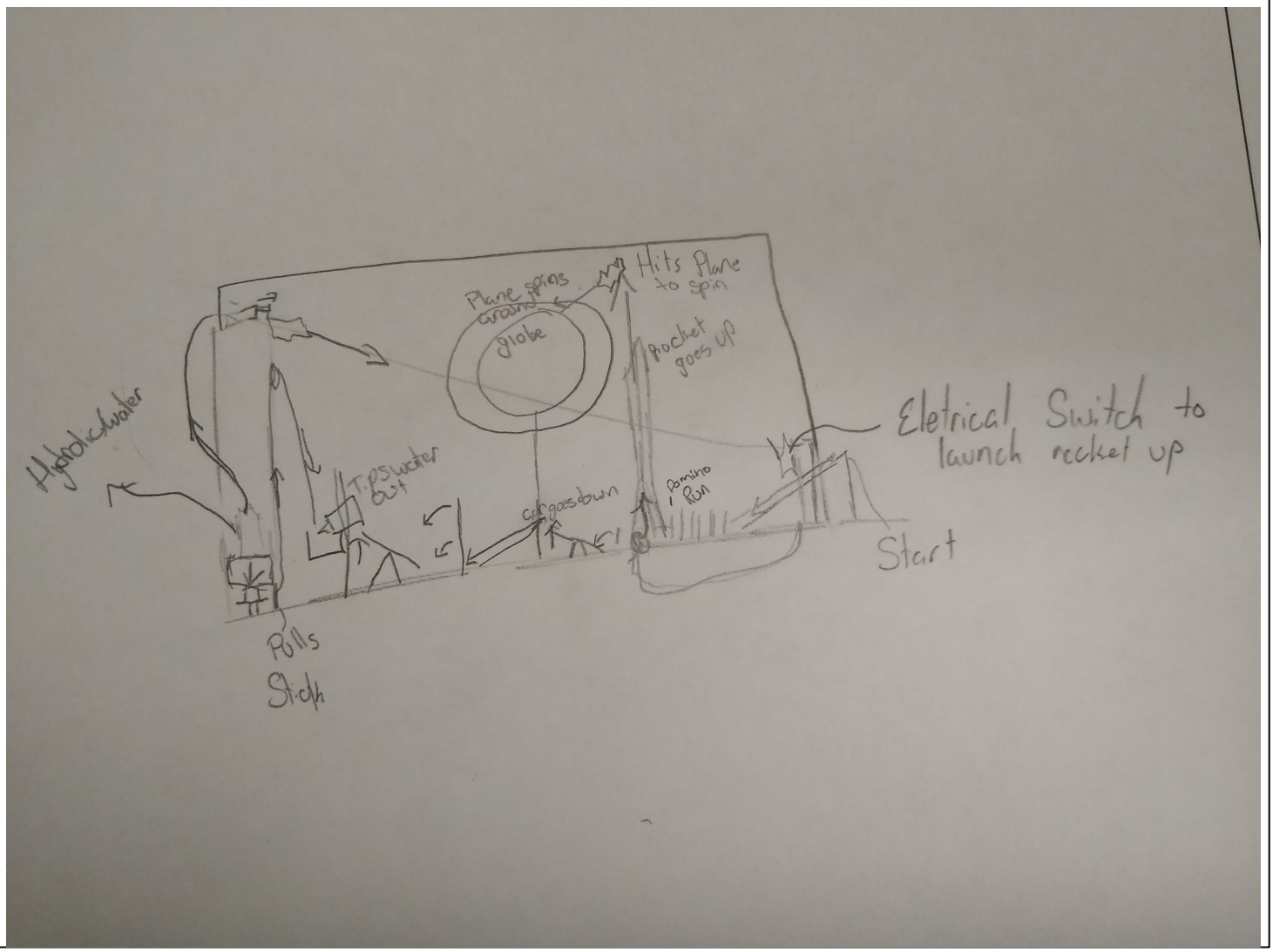
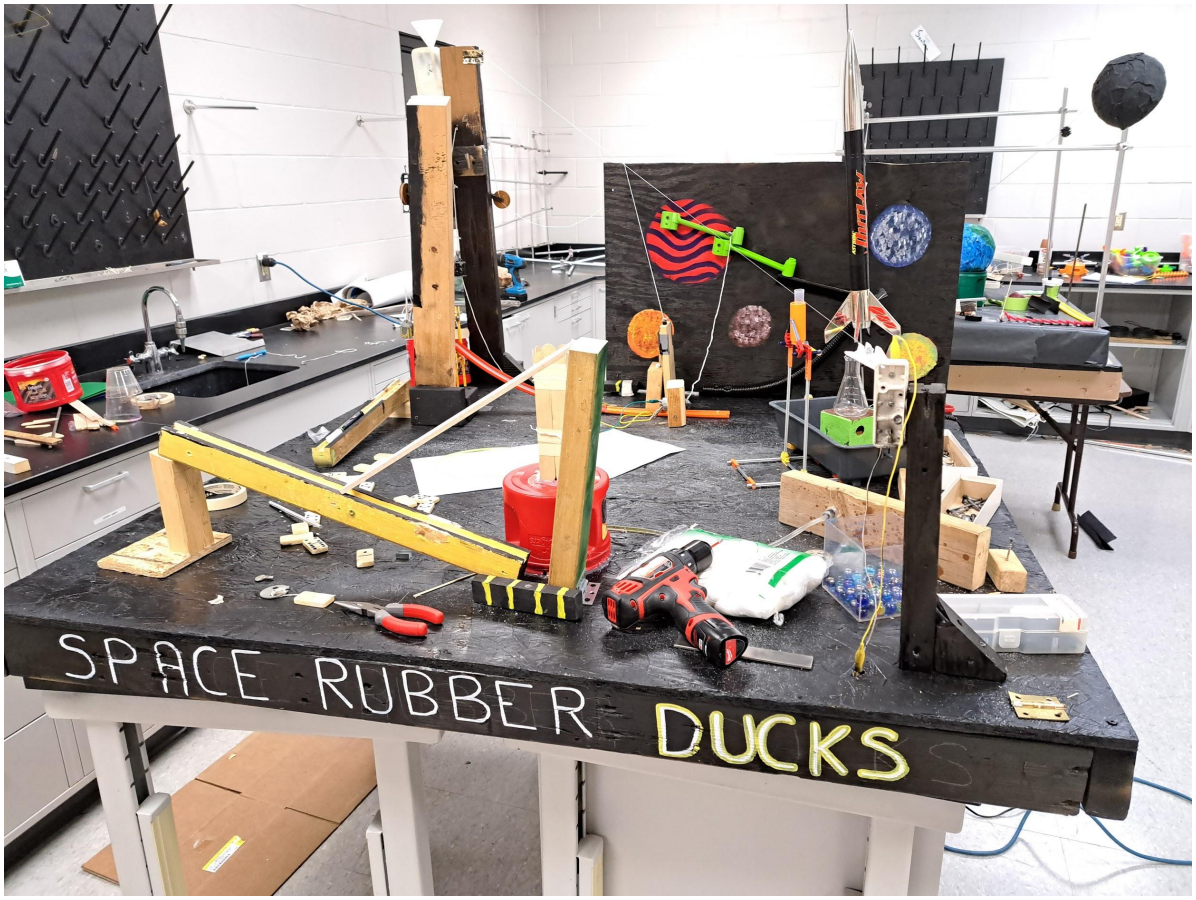
Planned Machine Design Sketch and Description



Hydraulic water
Plane spins around
Hits Plane to spin
globe
Rocket goes up
Eletrical Switch to launch rocket up
T.P sucker out
car goes down
Domino Run
Start
Pulls Stick

This was a very rough idea of what we wanted so a lot of step were missing and it needed advanced components. We also didn’t think through physics and the reliability of the steps.

Final Machine Design Picture and Description



In this picture there is still a lot of clutter when finished it will be more neat. We have all our wood towers and our standing piece of plywood to give us height and more of a three dimensional look instead of the two dimensional look we had last year. We have a lot of inclined planes and drops to utilize gravity.

List of Machine Steps | Clearly describe and number machine steps. Advanced Component steps clearly identified.

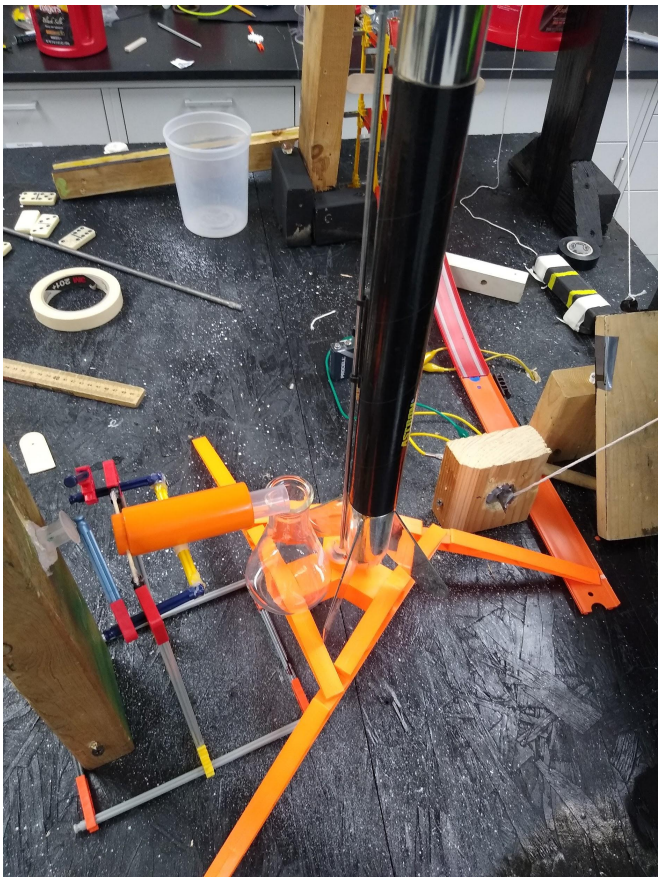
1. Car goes down track hitting stick
2. Block is knocked over
3. Weight falls
4. Plane Flying
5. Motor starts pulling key (Electrical Step)
6. Marble goes down ramps
7. Board Falls
8. Pulling plug on bottle
9. Water flows out into container
10. Container goes down weight goes up
11. Marble down ramp
12. Dominoes run
13. Marble down
14. Hits 2x4
15. Falls Pulling Skewer
16. Weight drops
17. Hydraulic Syringes activate (Fluid Step)
18. Test tube knocked over
19. Elephant Toothpaste (Chemical Reaction)

Cost of Machine and Percent of Recycled Materials Used

Item	Cost
Yeast	$11.84
Duct Tape	$11.64
Hydrogen Peroxide	$2.85

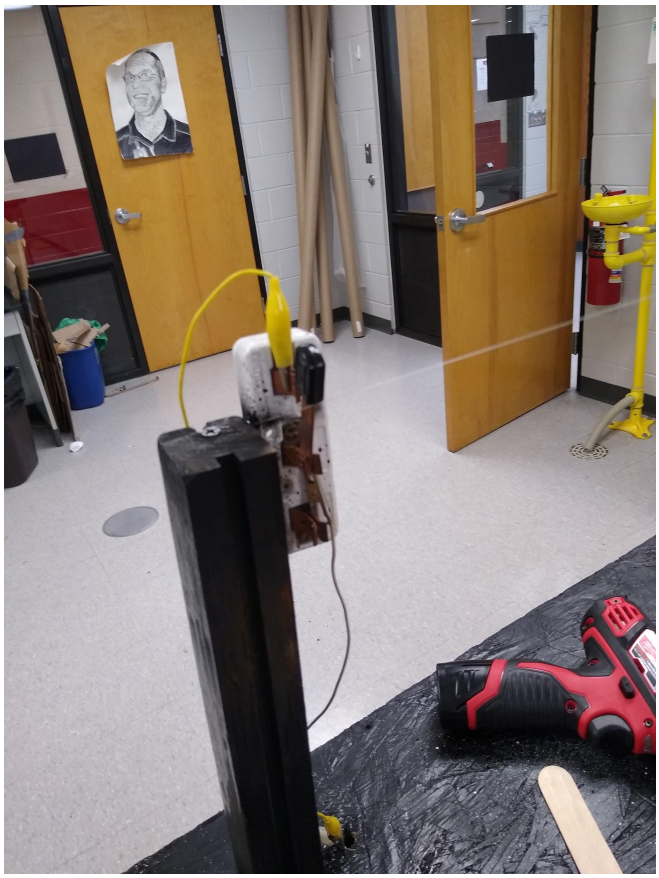
We used a lot of the materials left behind from past contests. Such as all the wood, syringes, weights, K'Nex, dominos, electrical, pulleys, tubing. All of that was put in drawers and cabinets in our STEM room from past contests and scraps left over from our shop classes. The screws and hinges are from our janitor supply closet. The food coloring is from the Family Consumer Ed classroom. All tools being used are also borrowed from our school janitors. We believe 98% of our machine is recycled products.

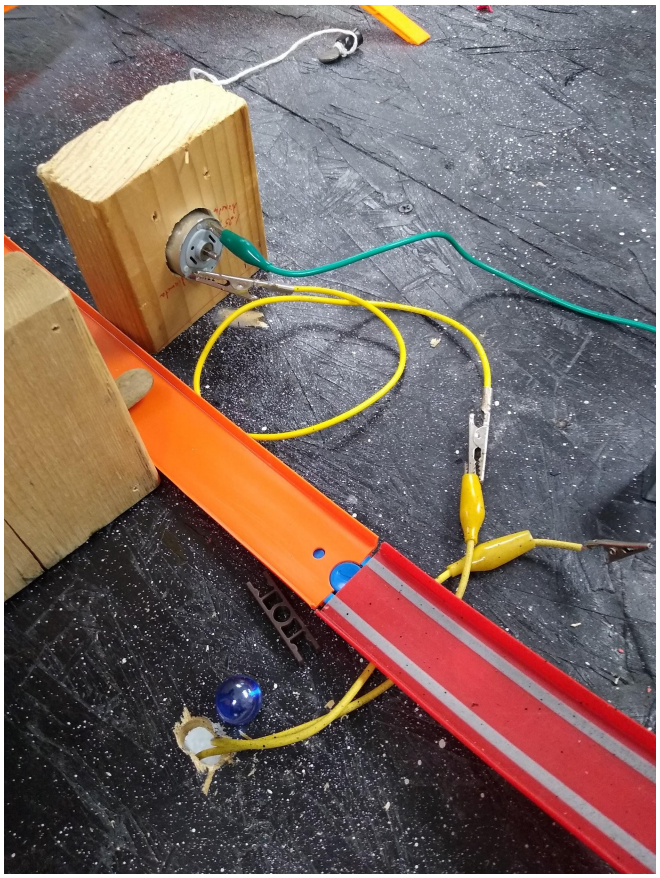
Chemical Step



We will have a Hydrogen Peroxide and food coloring mixture in the erlenmeyer flask. We will have our water and yeast in the test tube that is glued into the orange plastic tube. This is our final step and we are using it as a “failed rocket launch” as it fill just foam out and the rocket won’t go up. We didn’t know how to launch the Rocket to keep it on the machine.

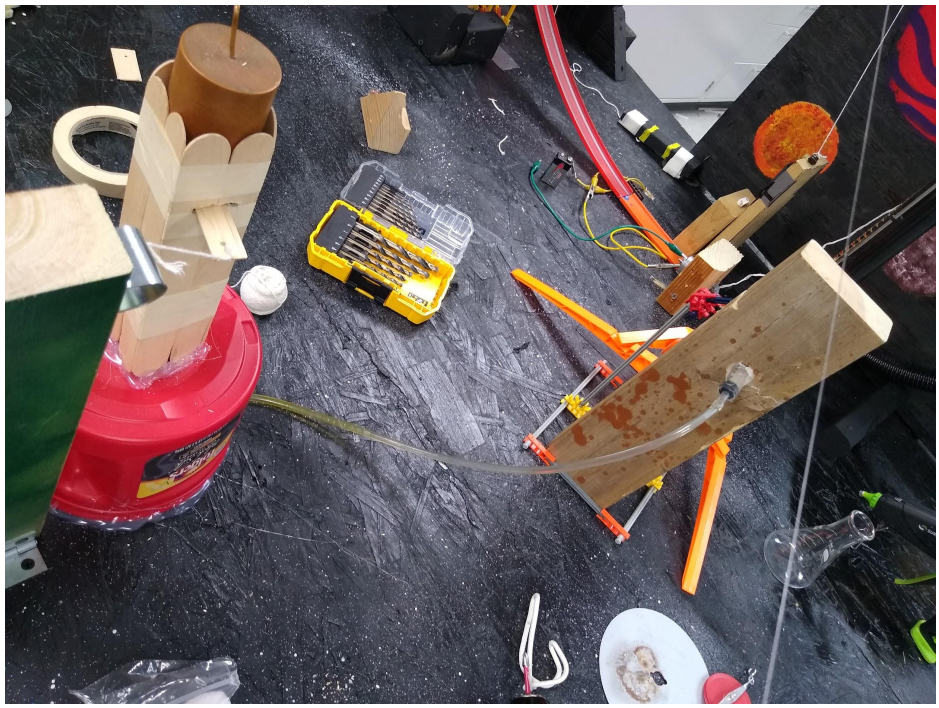
Electrical Step





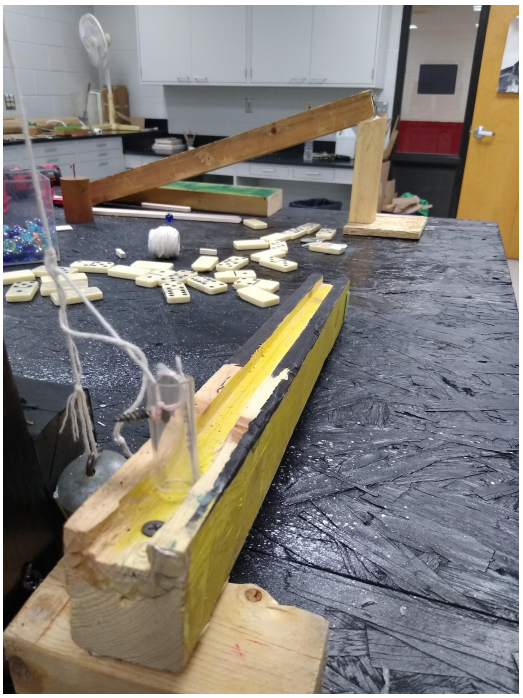
We have a plane coming down the fishing line to pu
switch in to complete the circuit. It is connected to a
battery and a small motor. When the circuit is conn
turns the motor on and pulls a piece of wood out of
step.

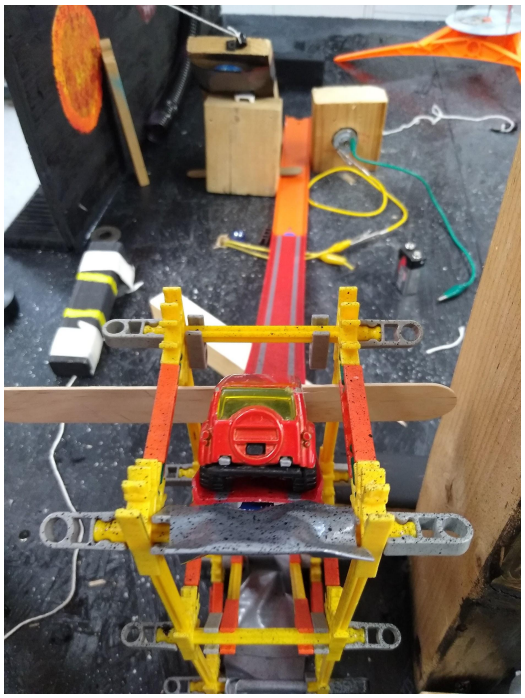
Fluid Step



In the Observation Tower (popsicle stick tower) there is a large syringe connected to a tube which is connected to another smaller syringe that is glued in a block. We have a 1000g weight pushing down on the hidden syringe which transfers the water to the second syringe which knocks over our next step. This will activate the final step or blast off.

Mechanical Step





Mechanical is by far the easiest incorporate. We used inclined planes throughout our machine to have cars and marbles roll down and start our next steps.

Reflection

We started with only 3 kids and throughout the time we gained 4 others. It was first just accepting others who didn't know what was happening then it was catching them up and getting them working on other things. We each had our role and some people had bigger roles and others had smaller roles. However, we all had very much resilience when it came to this machine because it was one problem after another. We became so much better at communicating with each other that we could work on things alone and everybody still knew what was going on.

Although Mackenzie has already taken physics this machine has taught everyone more about how physics works and how to get things to work the way we want it to. Of us that haven't taken physics we plan on using what we have learned to help us work our way through it.

We had a lot of trouble getting our steps to work like after the marble run on the wall we couldn't get it to knock anything over and we were having issues until we finally found a smaller piece of wood. We had created a small loop between 3 steps: the plane, the marble run on the wall and the electrical step. We had to find a way to interrupt that loop and we eventually settled on adding a car run that would hit a stick to start the plane falling. We knew right from the start that we were gonna have planets and stars everywhere on the board, however as the competition got closer we didn't have time to decorate anymore because we were still finalizing steps.

Word Count: 279

Diary of building process, photos

Journal

Sep. 30 Brainstormed and cleared up last year's project from the board.

Oct. 7 Started to drill holes to put boards up

Oct. 10 Attached screws and pulleys to boards.

Oct. 12 found rockets and attached string and NASA spaceship to boards.

Oct. 13. Attached marble runs tracks to the plywood board.

Oct. 18 Pulled a bunch of stuff out of drawers to brainstorm.

Oct. 20 Brainstormed next steps and tried a couple steps.

Oct. 24 Brainstormed and fixed some things that others did to our machine.

Oct. 28 Tried out a mini motor and ways to connect it to switch.

Nov. 3 Got Switch sorted out.

Nov. 10 Put in coffee pail and funnels for some water movement.

Nov. 16 Brainstormed and got other parts of the marble run set up.

Dec. 5 Added weights and more wood

Dec. 10 Added small marble ramp and domino run

Dec. 20 Painted boards

Dec. 27 figured switches to go under board and added another ramp

Jan. 25 Added a motor

Jan. 28 Added motor mount

Feb. 1 started painting sides and unpainted areas

Feb. 9 Painted planets and other paint

Feb. 14 painted the rest of the wood and unpainted areas on the base

Feb. 20 Started adding more steps and changed the way some worked

Mar. 6 Thought out chemical step

Mar. 10 Thought out how to get some drops and what final steps should be

Mar. 14 Realized we don't have water step started getting that out

Mar. 15 Worked on how to set off chemical step using other steps

Mar. 17 Worked on hydraulics and chemical step

Mar. 22 Finalized everything and will continue to make sure steps are consistent until competition

Diary of building process, photos