Team Journal
STEAM TEAM

March 14, 2023

Transforming Space Technology
Into Orbit
Brain Storming Monday Feb 20
Joseph Lambe
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Planned Machine Design

Solar panel like on 755

Super hero dog/cat super smart
steam team = bad guys - machine will open solar panel/powers missile to blow up moon

Will dog & cat stop you

Space lunch on the first day
Re purposed: back boards are corn hole game
- bin lid
- marble track
- Hot Wheels track
- micro bit supplies
- blocks
- wood scoops for mouse trap
- we had space, toys already
- syringe and tube

Recycled:
- water bottle
- caps from bottle
- old remote control
- paint stirrer
- red container lid
- old book

Percent Recycled: 80%

Expenses:
- 2 mousetraps $2.00
- 30 party poppers $7.50
- 4 extra stepper motors $9.00
- spray paint $6.50
- peg board hooks $10.00
- vinegar $2.00
- baking soda $0.50

Total: $37.50
Chemical component

Baking soda in cap

Block

Warp
Core

Immerse
Vinegar

Tray

Label: Black

Hole

Danger: do not add baking soda

Problem: cap falls off

Solution: put glue dots around skewer
north

Today we fixed the machine and incorporated the reaction.

Problem: Marble rolls too fast and bounces off bottom track.

Solution: Added funnel (cut off water bottle) to make motion only down, not sideways.

Label: Black Hole
Monday March 6

Ideas:
- Vinegar in tray triggers electrical's liquids, alarm, escape pod
  blown by fan or booster
  - Worked on code to make sound effects
Web March 8

Spring ➔ marble ➔ dominos fall ➔ pulls string for baking soda cap ➔

shaftepins ➔ vinegar spills over ➔ 2 wires in red lid are shorted ➔

dsprings ➔ triggers microbit driving stepper motor ➔ triggers mousetrap
drivers ➔ triggers petter microbit mouse trap party off

name

date
Thursday, March 9

Try to hook up all components so far.

Design change: Added other wall board to get more space.

Added hot wheel track.

- Space shuttle pendulum.

- Marker.

Problems: In domino chain, marker didn't fall reliably.

Solution: Used remote control.

Problems: Cup of baking soda, how to dispense small soda.

Solution: Use scoop.
Sat March 11

Problem: Block at end of hot wheels track not reliable
Solution: heaven? taped 2 blocks together, marked best position

Problem: Attatch syringe more securely
Solution: Hot glued popsicle sticks to wall board to hold syringe

Fluid Power Step
Fighting the evil dog clan who are trying
- enters on hydraulic arm goes through wood hole
to get to space shuttle - get past "blockade"

- stealing... space shuttle - crash into Neptune "boob"
- release satellite through black hole to trigger
  asteroid belt (dominoes) destroy ship by
  spraying asteroid acid all over warp core (vinaigrette
  bottle) ➔ scrambles systems but actually
  activates confetti shield

- need 2 dogs for decoration

VEX 10
List of Machine Steps

1. Pressing syringe lowers wooden tube, causing marble to roll out. FLUID POWER STEP
2. Marble rolls down Hot Wheels Track, knocking off blocks.
3. Falling blocks yank out peg board hook.
4. Hook releases space shuttle pendulum. MECHANICAL ACTION STEP
5. Space shuttle knocks over book, which fall on clothespin.
6. Clothespin opens, releasing yarn.
7. Loose yarn lets cap release marble.
8. Marble rolls down tracks, through funnel, and hits dominoes.
9. Dominoes knock over remote, then small block, then big block.
10. Big block pulls yarn that is wrapped around cork, which spins cap and dumps baking soda.
11. Baking soda reacts with vinegar and spills over into peanut lid. CHEMICAL REACTION STEP
12. Vinegar completes circuit between two electrodes in peanut lid.
13. Micro:bit senses the completed circuit and drives stepper motor. ELECTRICAL STEP
15. Mousetrap pulls string of party popper.

Bibliography

https://www.robotique.tech/robotics/control-a-stepper-motor-by-microbit/
Tutorial to hook up the Micro:bit to a stepper motor.

Domino Masters, Season 1, episode 2 "Holidays".
This TV show has Rube Goldberg components. This is where we saw the idea for the party popper pulled by a mousetrap.

Makecode. https://makecode.microbit.org/
The code editor used to write the code that controls the stepper motor and senses the circuit made with the vinegar.

This is an interface that allows the Micro:bit to interface with the stepper motor.

15

name

date
Field Diagram

Mechanical Step

name

date

VEX IQ
Reflection

Challenge: hooking up the stepper motor. I learned that some of the pins on a Micro:bit cannot be used to hook up a stepper motor. This was most of the problem. I was trying to plug in an input on an LED display pin. That would not work since it was always active. The article at Robotique helped to learn which pins to use. Because I learned how to hook up a stepper motor, now I can use one in future applications.

Challenge: staying focused when working with a friend. I learned that it is challenging to stay focused when working with a friend. We tried playing a little bit before working on the project. Then we focused a bit better.

Challenge: Getting the blocks to fall off when the marble bumped into them. The blocks on the Hot Wheels Track were hard to place correctly so they would fall off when we wanted, but not accidentally. We drew lines on the track with a Sharpie so we could place them correctly.

Reflection Word Count: 172 words

Code

![Code diagram]