Fourth and Fifth Grade STEAM Curriculum

Board of Education Presentation • May 10, 2022

Presentation Overview

1. Introduction to unit one of the fourth grade STEAM Curriculum
    a. A closer look ar the art and science of creating the ‘slugs”
    b. Robotics introduction
    c. Artifact examination
2. Introduction to unit two of the fourth grade STEAM Curriculum
    a. Math and creating armatures
    b. Digital art,beastie friend, and robotics
    c. Artifact examination
3. Introduction to unit one of the fifth grade STEAM Curriculum
    a. Learning the basics and terminology of block coding - simple to advanced
    b. Game design
    c. Artifact examination
4. Introduction to unit two of the fifth grade STEAM Curriculum
    a. Engineering and design of newspaper and glue chariot style vehicles
    b. Combing coding with the engineering project
    c. Artifact examination

Introduction

4th Grade, Unit 1 - Professional Slugball League

The students learn how to use a vector art program, learn about the external structures of the eyeball, how to engineer a plastic cup into a slug, and then learn how to control their slug through a robotic means.

Profile of a Graduate:

Design & Product Creation

Slug Engineering Design Process

Skins

Students are introduced to a professional vector art program, learn to use the different tools and filters while expressing their own creativity.

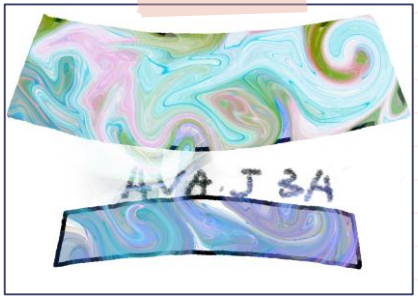
Eyeballs

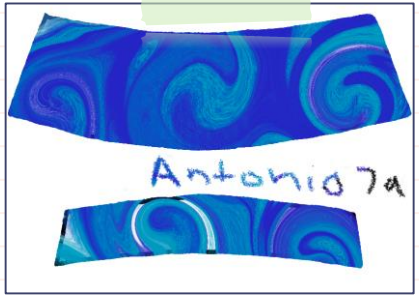
Students first learn about the outer structures of the eyeball and then build off their previous knowledge while learning new techniques to create eyeballs of their own design.

Slugs

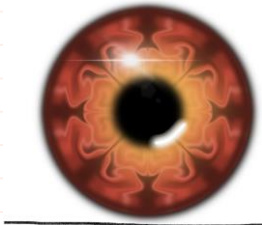
After color printing the slugs and eyeballs, the students build their slug with a plastic cup, hot glue, and tape.

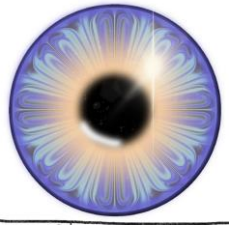
Slug Skin Examples

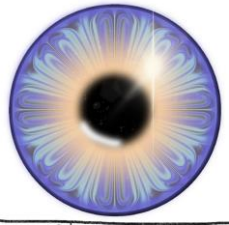




Eyeball Examples







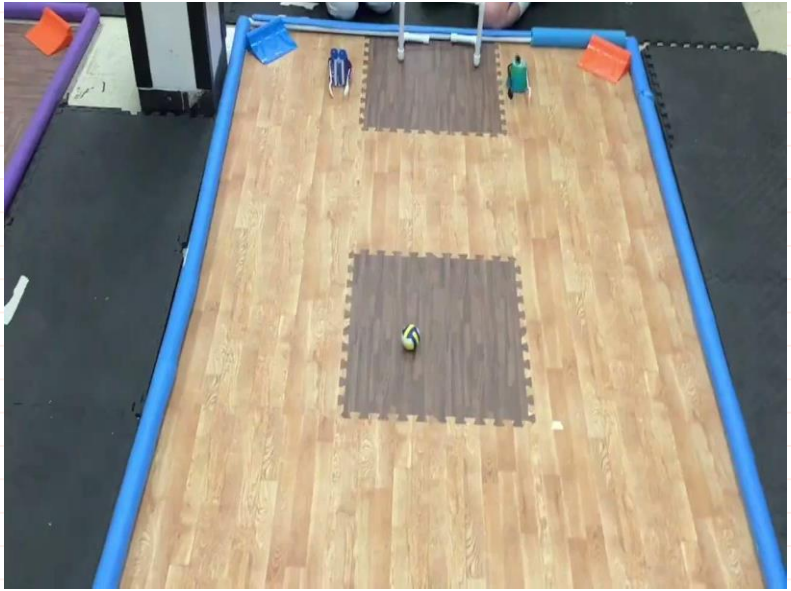
Completed Slugs - Examples

Front View

Side View

Using their slugs, the students are introduced to robotics by learning how to control their slug via a Sphero Bolt robot while playing a game of slugball.

Slugs in Action



Introduction

4th Grade, Unit 2 - My Beastie Friend and I

Building off of their previously acquired knowledge of vector art and robotics, the students will design a digital art version of themselves in the style of a Funko Pop character. They will then design a beastie friend, who is controlled by robotic means, and perform a series of skill based tests while their character is riding their beastie friend.

Profile of a Graduate:

Design & Collective Intelligence

Character Design

01

Armatures

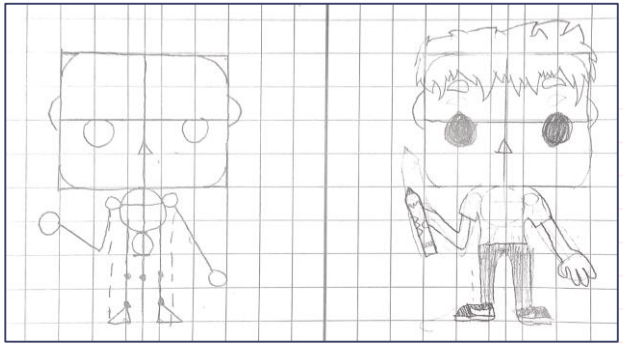
The first step in creating a Funko Pop style version of themselves is to learn how to draw an armature. The students learn how to draw and pose an armature before turning that armature into a sketch drawing of themselves.

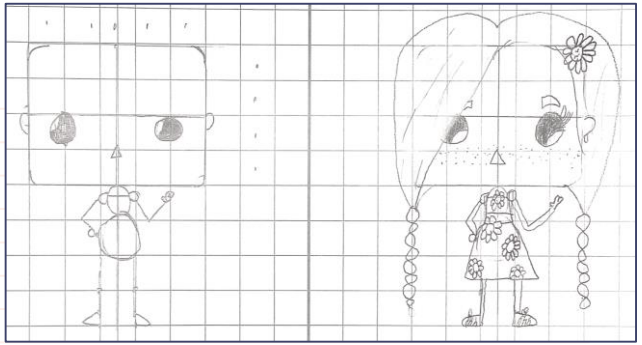
02

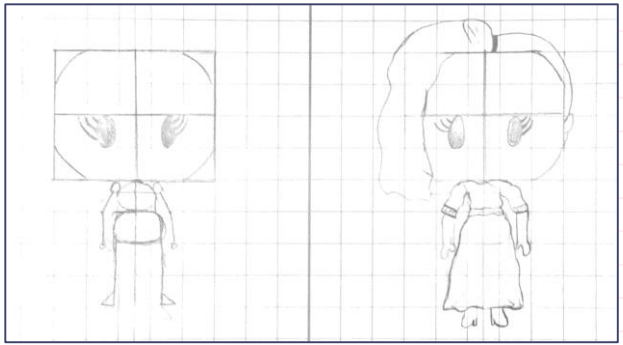
Digital Characters

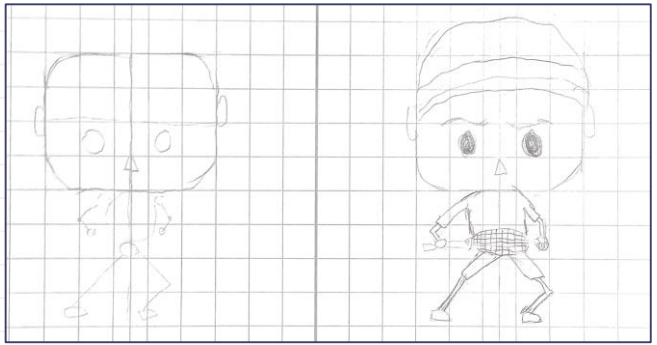
Once the sketch drawing is complete, the students learn how to transfer the character into a digital format via their iPad. Using their original sketch, the students learn how to turn the sketch into a digitally rendered and colorized character.

Armatures

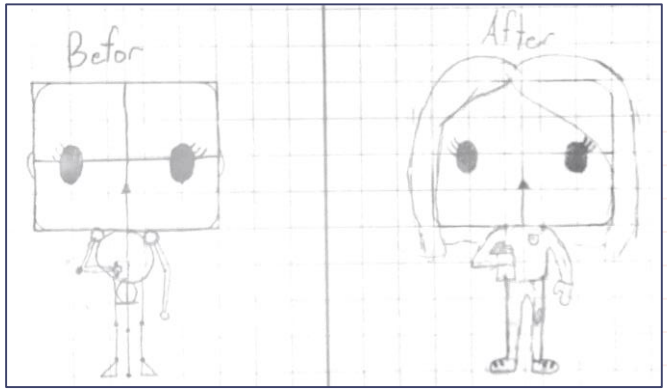


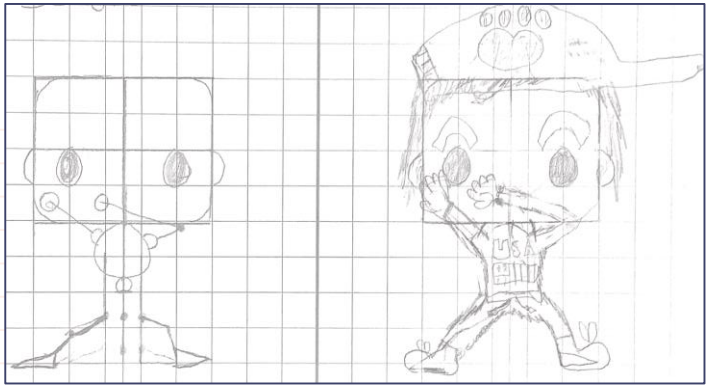


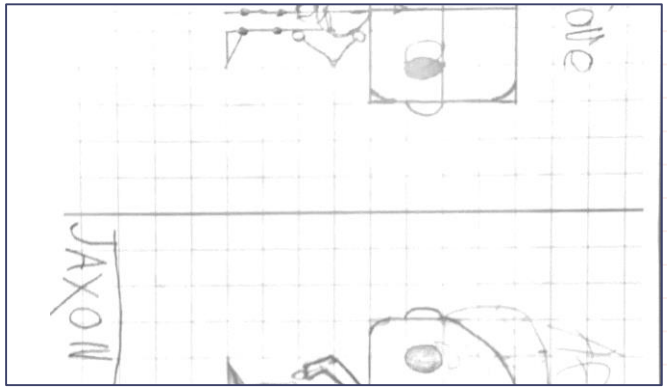


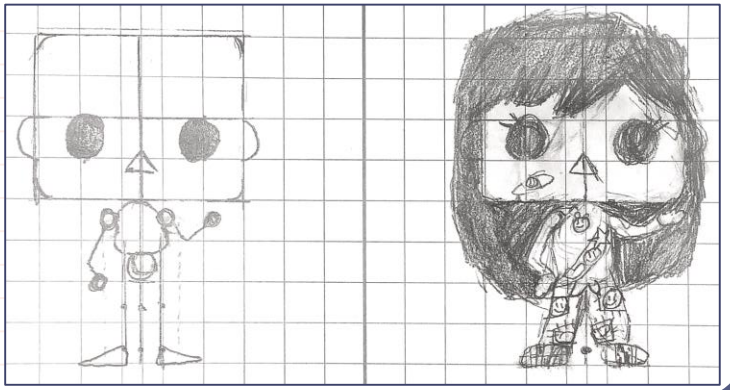


Armatures





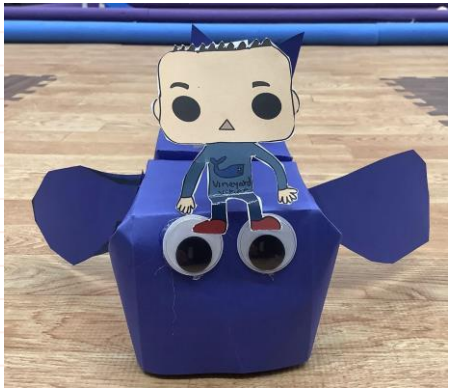




Digital

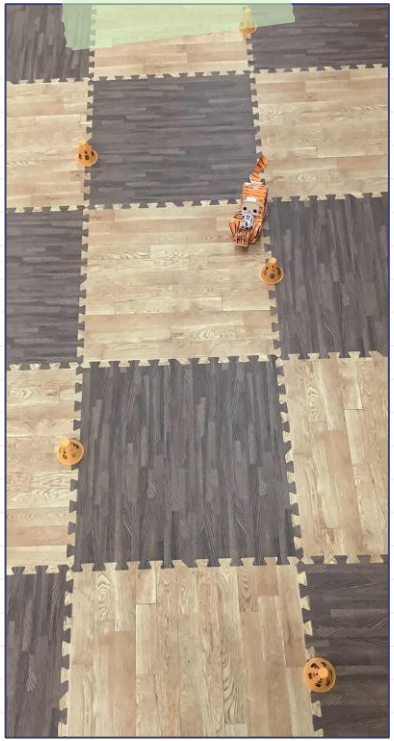
Digital

Beastie Friends



Skills Demonstration

Students show off their robotics skills by navigating their beastie and friend through an obstacle course.



Introduction

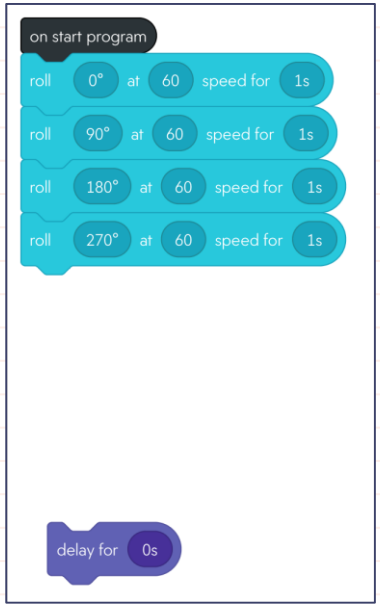
5th Grade, Unit 1 - Coding + Robotics

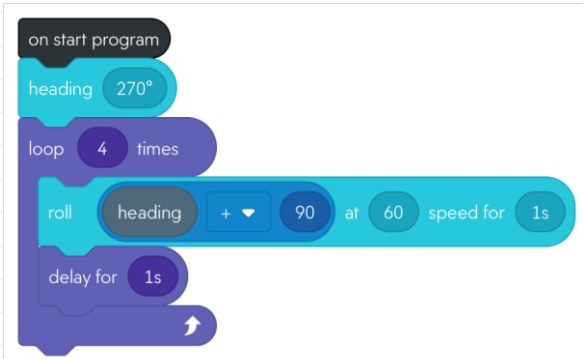
The students learn how to code their Sphero Bolt using block code. They are introduced to all of the categories of blocks that are available to them through a series of coded games. The unit culminates with the students designing their own game to play with Bolt.

Profile of a Graduate:

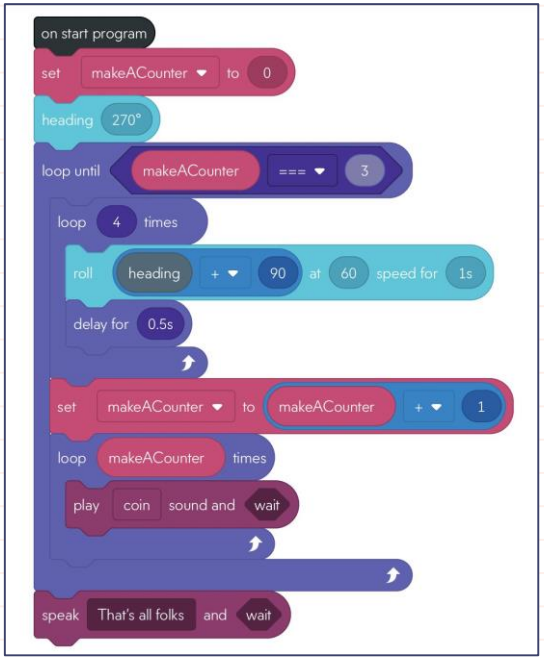
Design & Collective Intelligence

We Start Slowly...

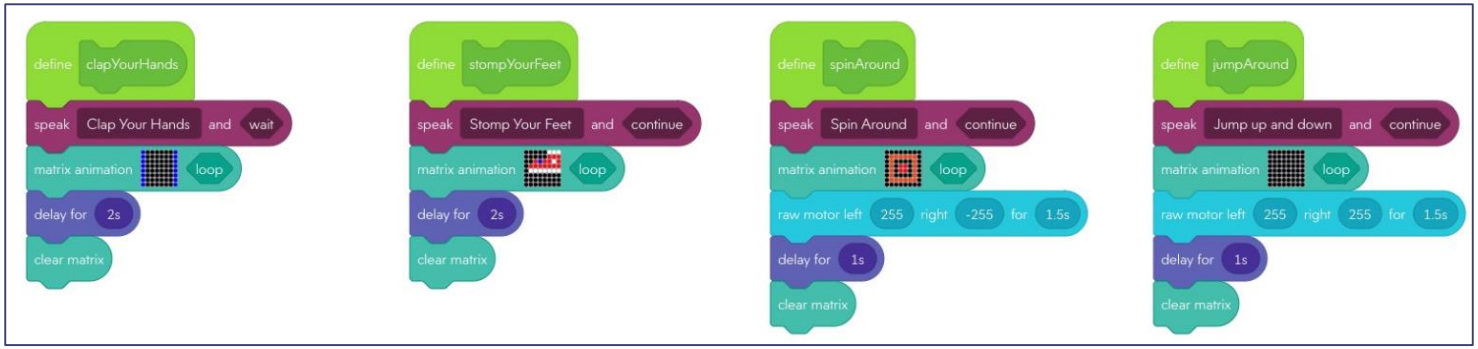




Gradually We Build...

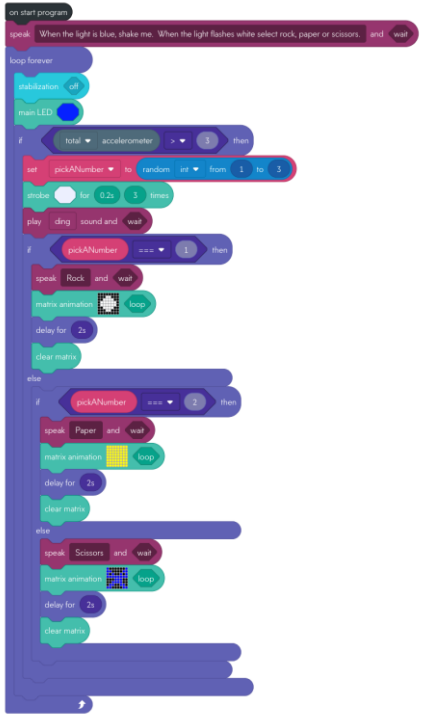


Until We Can Build Some Complex Programs...

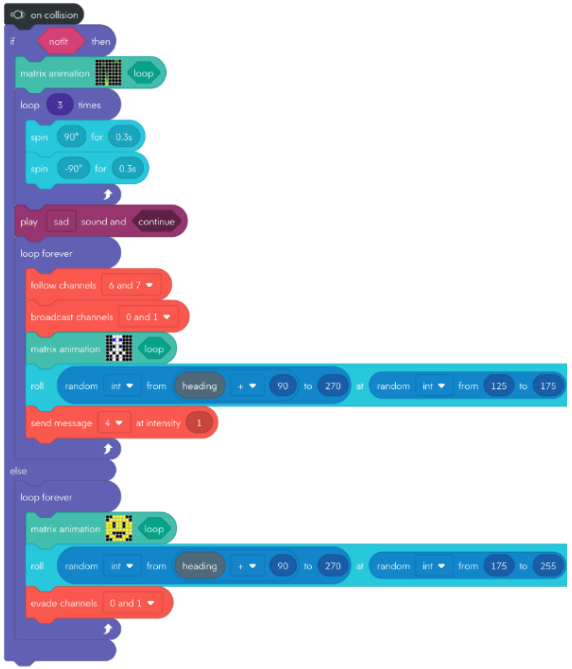


Culminating in Student Created Games

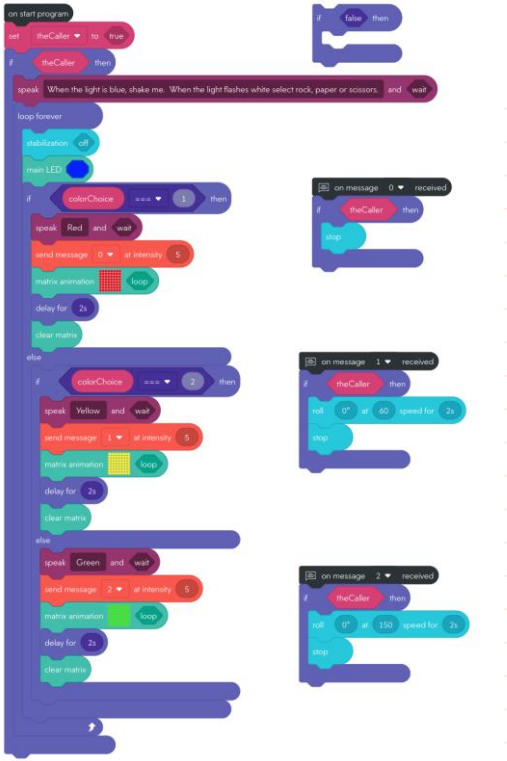
Rock, Paper, Scissors




on start program
set notIt to true
if notIt then
loop forever
matrix animation loop
roll random int from heading + 90 to 270 at random int from 175 to 255 speed for random int from 2 to 4
evade channels 0 and 1
else
loop forever
broadcast channels 0 and 1
matrix animation loop
roll random int from heading + 90 to 270 at random int from 125 to 175 speed for random int from 2 to 4


on collision
if notIt then
matrix animation loop
loop 3 times
spin 90° for 0.3s
spin -90° for 0.3s
play sad sound and continue
loop forever
follow channels 6 and 7
broadcast channels 0 and 1
matrix animation loop
roll random int from heading + 90 to 270 at random int from 125 to 175
send message 4 at intensity 1
else
loop forever
matrix animation loop
roll random int from heading + 90 to 270 at random int from 175 to 255
evade channels 0 and 1

A game of tag



Red Light, Green Light

Introduction

5th Grade, Unit 2 - Paper Engineering

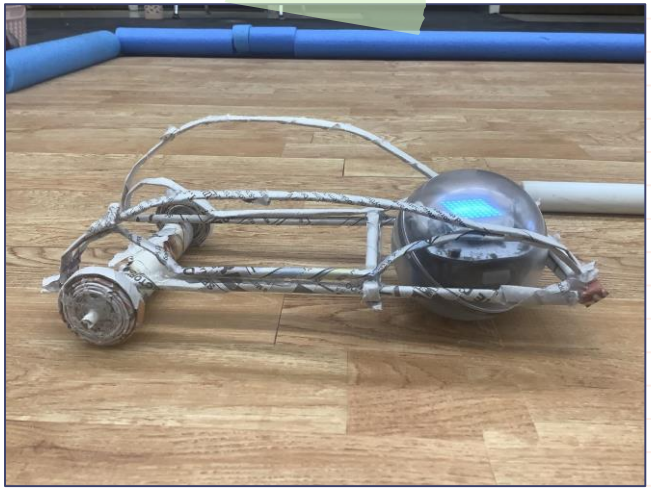
In this first part of this unit, the students are introduced to design with paper engineering. The students use newspaper and glue to design a chariot style vehicle that can be powered by their Bolt. In the second part of the unit, the students code their Bolt to travel five times around the racetrack without hitting the sides or center divider.

Profile of a Graduate:

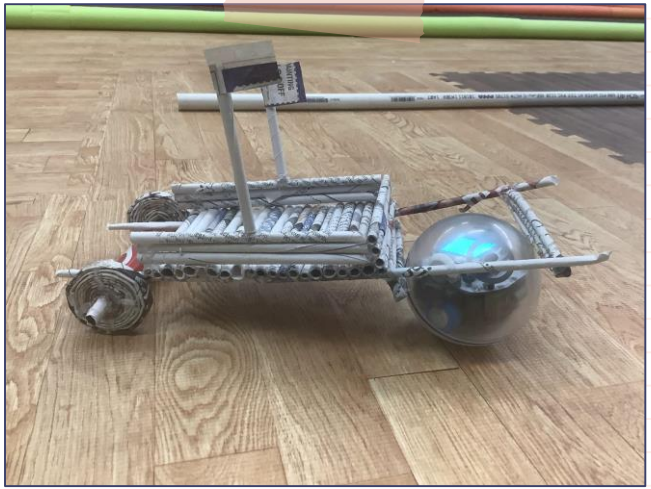
Design & Product Creation

Materials

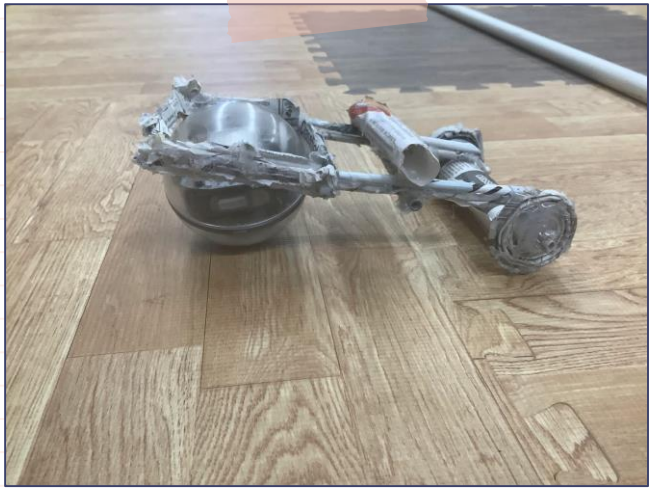
The Designs



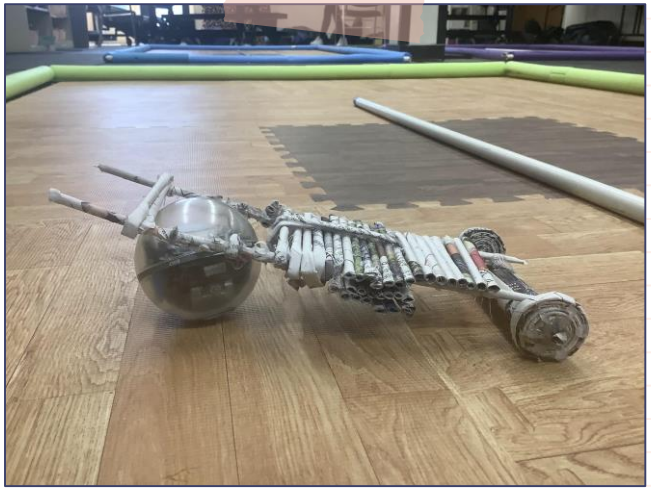
The Designs

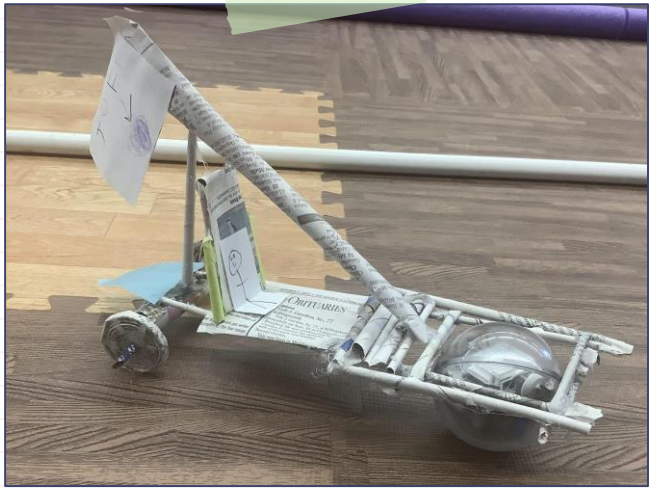


The Designs

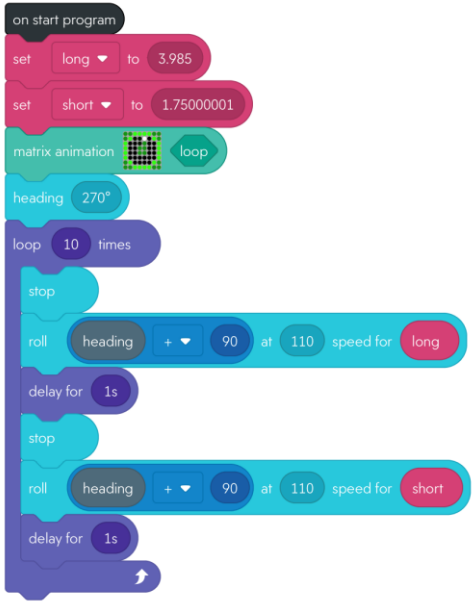


The Designs





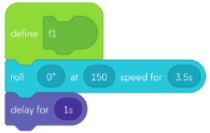
Code in All Shapes and Sizes




on start program
firstWay
secondWay
thirdWay
fourthWay
f1
secondWay
t3L2
fourthWay
loop 3 times
f1
secondWay
t3L3
fourthWay
matrix animation once
exit program


define firstWay
roll 0° at 150 speed for 4.25s
delay for 1s


define thirdWay
roll 180° at 150 speed for 3.75s
delay for 1s


define f1
roll 0° at 150 speed for 3.5s
delay for 1s

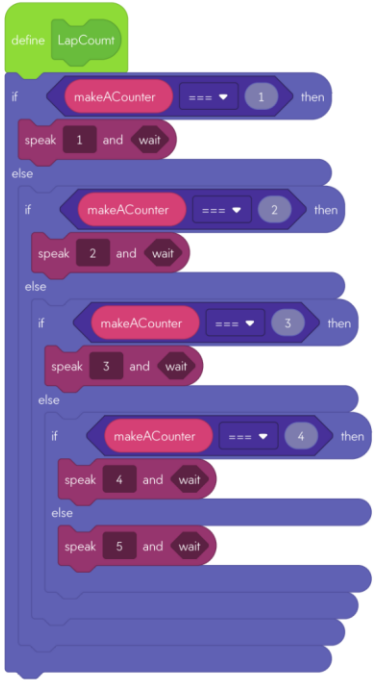

define t3L3
roll 180° at 150 speed for 3.6s
delay for 1s


define secondWay
roll 270° at 150 speed for 1.5s
delay for 1s


define fourthWay
roll 90° at 150 speed for 1.5s
delay for 1s


define t3L2
roll 180° at 150 speed for 3.6s
delay for 1s


on start program
set goStraight to 3
set goLeft to 1.5
set goRight to 3
set goBack to 1.5
set makeACounter to 0
loop 5 times
roll 0° at 95 speed for 4.3s
delay for 1s
roll 270° at 95 speed for 1.6s
delay for 1s
roll 180° at 95 speed for 4.3s
delay for 1s
roll 90° at 95 speed for 1.7s
delay for 1s
set makeACounter to makeACounter + 1
LapCount


define LapCount
if makeACounter === 1 then
speak 1 and wait
else
if makeACounter === 2 then
speak 2 and wait
else
if makeACounter === 3 then
speak 3 and wait
else
if makeACounter === 4 then
speak 4 and wait
else
speak 5 and wait