

## Curriculum & Student Development Committee

Tuesday, May 10, 2022 5:30 PM

Hammonasset Room / Zoom, 10 Campus Drive, Madison, CT 06443

### I. STEAM Units: Grades 4 and 5

**Speaker(s):** Mike  
Ginsburg

### II. Performing Arts Vision

**Speaker(s):** Leah  
Stillman

### III. Public Comment

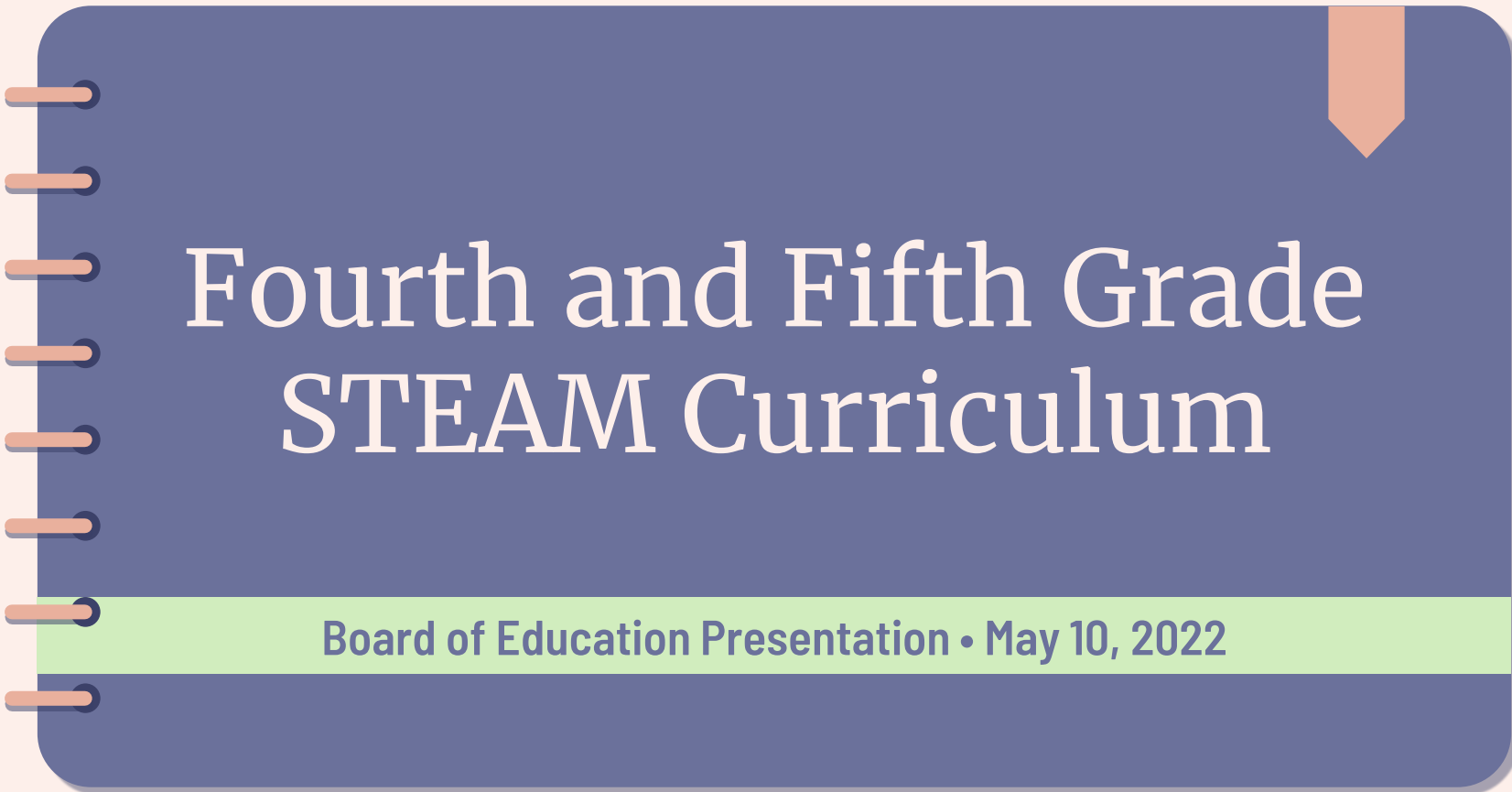
IV. "The Town of Madison does not discriminate on the basis of disability, and the meeting facilities are ADA accessible. Individuals who need assistance are invited to make their needs known by contacting Paula Carabetta at 203-245-5644 or by email to [carabettap@madisonct.org](mailto:carabettap@madisonct.org) at least five (5) business days prior to the meeting."

## Grade 4 STEAM Curriculum Overview

2021-2022

<p><b><u>Unit 1</u></b> <i>Professional Slug Ball League</i></p>	<p>Students will be introduced to the world of digital art and robotics. In the first half of the unit the students will use a digital art program to learn the different functions of the program while creating a pair of eyeballs (pupil, iris, and sclera) in their choice of anime, chibi, or own creative design. They will then use the eyeballs they created to help manufacture the body of a robotic slug creature. The slug creatures will be powered by Sphero Bolt and have a foosball ball that is part of its tail. The second half of the unit will be comprised of the students learning how to drive the Bolt powered creature while playing a game of Slug Ball. The final assessment will demonstrate how well they have learned to drive Bolt as they engage in a friendly Slug Wars competition.</p> <p><b>Profile of a Graduate Capacities:</b> Design, Product Creation</p>
<p><b><u>Unit 2</u></b> <i>My Beastie and I</i></p>	<p>Building off the knowledge gained in unit one of the fourth grade STEAM unit, students will continue expand their knowledge of vector art and motion. To begin the students will learn how to draw a rendition of themselves as a Funko Pop style character. The character drawing will be imported into a vector art program on the iPad. Using layers, the students will recreate their character in a digital format. The character will be color printed about 4 inches tall. Next, the students will create a beastie friend of their own design. The beastie will be powered by Sphero and constructed of paper base. The students will need to utilize their knowledge from unit one to successfully create a beastie that can run and be controlled via robot power. The digitalized characterization of themselves will ride upon their beastie to compete in races and the culminating activity of a battle to be the last beastie standing.</p> <p><b>Profile of a Graduate Capacities:</b> Design, Idea Generation</p>

<p style="text-align: center;"><b><u>Unit 1</u></b> <i>Coding + Robotics</i></p>	<p>In the first unit for fifth grade, the students will begin learning the basics of block coding through the use of a Sphero robot and the corresponding Sphero EDU app. The students will learn how to use block coding to perform tasks with increasing complexity throughout the learning activities. The activities (see learning plan) will be guided by the facilitator as the students learn how to use the different blocks to perform the given task. The essential materials needed, as previously stated, are the Sphero robot and the Sphero EDU app. The unit will culminate with the students collaborating on an original game program that is either new, an iteration of a previous game, or a refactoring of a game created during the unit.</p> <p><b>Profile of a Graduate Capacities:</b> Design, Collective Intelligence</p>
<p style="text-align: center;"><b><u>Unit 2</u></b> <i>Paper Engineering</i></p>	<p>The arts provide means for individuals to collaborate and connect with others in an enjoyable inclusive environment as they create, prepare, and share artwork that bring communities together. In this unit, the students will collaborate as they use an iterative process, through engineering design, to create a paper vehicle that is powered via technology. The students will then run their vehicles through a course to see whose design can survive the rigors of the track. The unit will launch with a "wonder" YouTube video viewing the art of Chie Hitotsuyama. The students will use the video as inspiration for developing their own paper designs.</p> <p><b>Profile of a Graduate Capacities:</b> Design, Collective Intelligence</p>



# 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 at 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. Combining coding with the engineering project
  - c. Artifact examination

A graphic of a spiral-bound notebook with a dark blue cover and orange rings on the left. The page is white with horizontal lines. A green banner is centered on the page. A blue arrow points from the left towards the center. A green box is on the right side, and a small orange tab is at the top right.

# 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

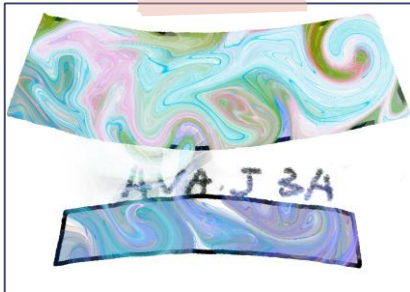
Students first learn about the outer structures of the eyeball and then build off their previous knowledge while learning new techniques to create eyeballs of their own design.

## 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



Annelise78



Annelise78



Melilah 78



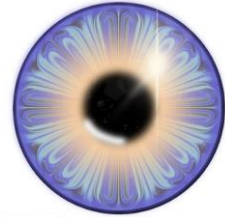
Melilah 78



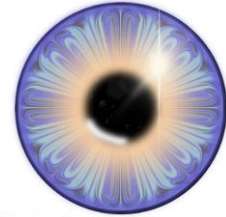
christina 7A



christina 7A



GIULIA 2A



GIULIA 2A

# 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.



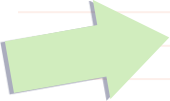
# Slugs in Action



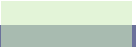



# Introduction

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

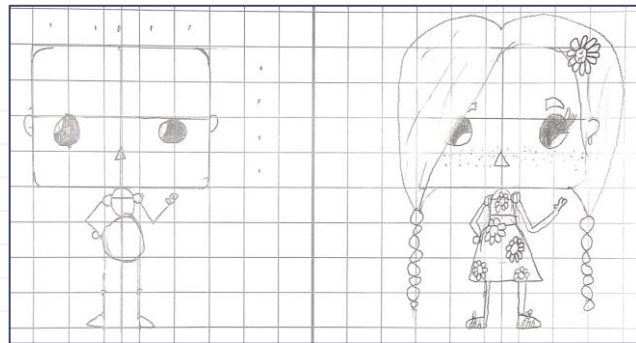
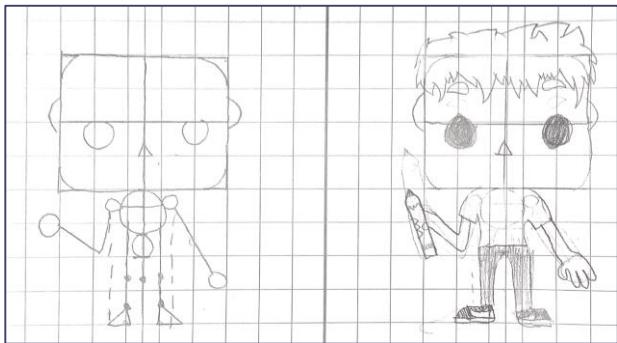
## Armatures

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.

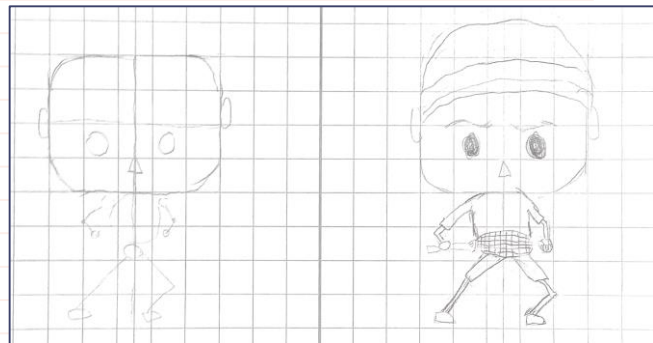
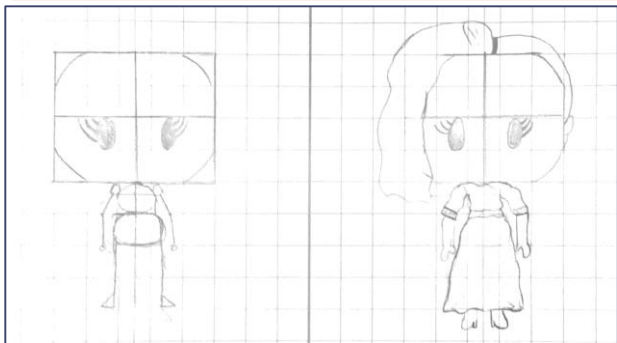
02

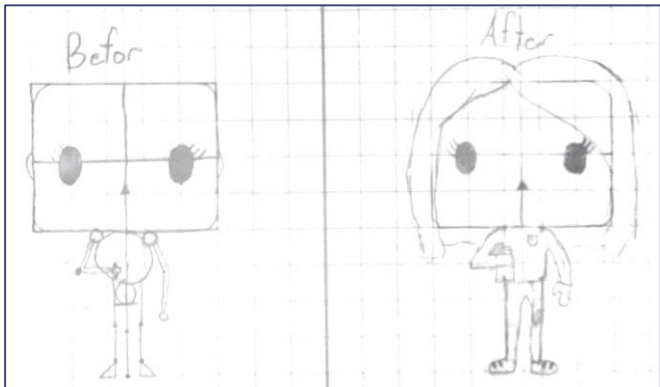
## Digital Characters

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.

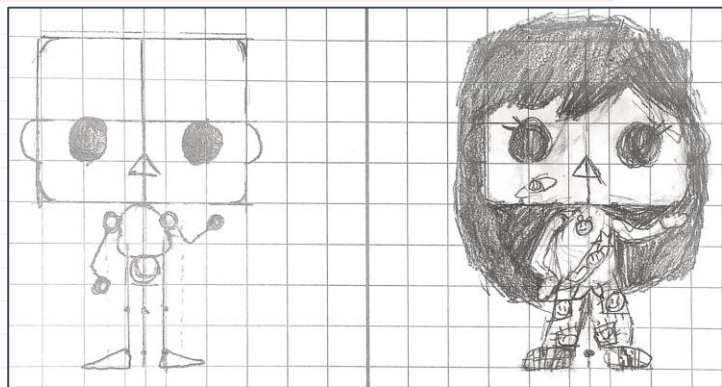
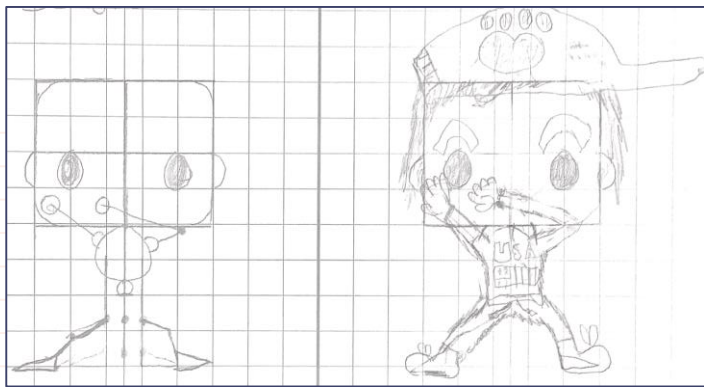


A  
r  
m  
a  
t  
u  
r  
e  
s

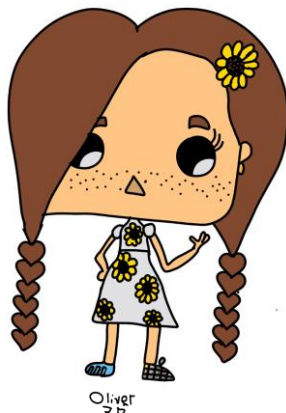




# A r m a t u r e s



D  
i  
g  
i  
t  
a  
l



Jonjo  
7A



Oliver  
3P



Parker  
7A



D  
i  
g  
i  
t  
a  
l



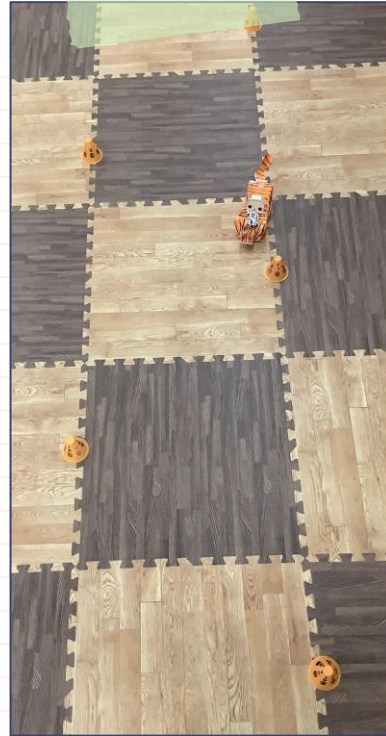


# Beastie Friends



## Skills Demonstration

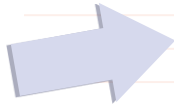
Students show off their robotics skills by navigating their beastie and friend through an obstacle course.



# 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.



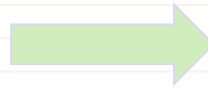
Profile of a Graduate:

Design & Collective Intelligence

# We Start Slowly...

```
on start program
roll 0° at 60 speed for 1s
roll 90° at 60 speed for 1s
roll 180° at 60 speed for 1s
roll 270° at 60 speed for 1s

delay for 0s
```



```
on start program
heading 270°
loop 4 times
roll heading + 90 at 60 speed for 1s
delay for 1s
```

# Gradually We Build...

```
on start program
set makeACounter to 0
heading 270°
loop until makeACounter == 3
loop 4 times
roll heading + 90 at 60 speed for 1s
delay for 0.5s
set makeACounter to makeACounter + 1
loop makeACounter times
play coin sound and wait
speak That's all folks and wait
```

The code block is a Scratch script starting with 'on start program'. It sets a variable 'makeACounter' to 0 and sets the heading to 270 degrees. A 'loop until' block is used to repeat the following actions until 'makeACounter' equals 3. Inside this loop, there is a 'loop 4 times' block. Inside the 'loop 4 times' block, the actions are: 'roll' (heading + 90, at 60, speed for 1s), 'delay for 0.5s', 'set makeACounter to makeACounter + 1', and another 'loop' block that repeats 'play coin sound and wait' for 'makeACounter' times. Finally, the script ends with 'speak That's all folks and wait'.

# Until We Can Build Some Complex Programs...

The image displays four Scratch code snippets, each defining a function. Each snippet starts with a 'define' block followed by a function name in a green box. The functions are:

- clapYourHands:** A 'speak' block with 'Clap Your Hands' and 'wait', a 'matrix animation' block with a grid icon and a 'loop' block, a 'delay for' block set to '2s', and a 'clear matrix' block.
- stompYourFeet:** A 'speak' block with 'Stomp Your Feet' and 'continue', a 'matrix animation' block with a grid icon and a 'loop' block, a 'delay for' block set to '2s', and a 'clear matrix' block.
- spinAround:** A 'speak' block with 'Spin Around' and 'continue', a 'matrix animation' block with a grid icon and a 'loop' block, a 'raw motor left' block with '255', 'right' with '-255', and 'for' with '1.5s', a 'delay for' block set to '1s', and a 'clear matrix' block.
- jumpAround:** A 'speak' block with 'Jump up and down' and 'continue', a 'matrix animation' block with a grid icon and a 'loop' block, a 'raw motor left' block with '255', 'right' with '255', and 'for' with '1.5s', a 'delay for' block set to '1s', and a 'clear matrix' block.

# Culminating in Student Created Games

Rock, Paper, Scissors

```
on start program
  speak "When the light is blue, shake me. When the light flashes white select rock, paper or scissors." and wait

loop forever
  stabilization off
  main.LED on
  if total > accelerometer > 3 then
    set pickANumber to random ev from 1 to 3
    shake for 0.2s 3 times
    play ding sound and wait
    if pickANumber == 1 then
      speak "Rock" and wait
      matrix animation loop
      delay for 2s
      clear matrix
    else
      if pickANumber == 2 then
        speak "Paper" and wait
        matrix animation loop
        delay for 2s
        clear matrix
      else
        speak "Scissors" and wait
        matrix animation loop
        delay for 2s
        clear matrix
```

```
on start program
  set notff to true
  if notff then
    loop forever
      matrix animation [robot] 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 [matrix] 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 notff then
    matrix animation [matrix] 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 [matrix] 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 [robot] 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

```
on start program
  set theColor to true
  if theColor then
    speak "When the light is blue, shake me. When the light flashes white select rock, paper or scissors." and wait
  loop forever
    stabilization off
    main LED
    if colorChoice == 1 then
      speak "Red" and wait
      send message 0 at intensity 5
      matrix animation loop
      delay for 2s
      clear matrix
    else
      if colorChoice == 2 then
        speak "Yellow" and wait
        send message 1 at intensity 5
        matrix animation loop
        delay for 2s
        clear matrix
      else
        speak "Green" and wait
        send message 2 at intensity 5
        matrix animation loop
        delay for 2s
        clear matrix
  if false then
    on message 0 received
      if theColor then
        stop
    on message 1 received
      if theColor then
        rot 0 at 60 speed for 2s
        stop
    on message 2 received
      if theColor then
        rot 0 at 180 speed for 2s
        stop
```

Red Light, Green  
Light

A graphic of a spiral-bound notebook with a dark blue cover and orange rings on the left. The page is white with horizontal lines. A light blue banner is centered on the page. A green arrow points from the left towards the text. A light blue bookmark is at the top right. A light blue box with a green tab is at the bottom right.

# 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.

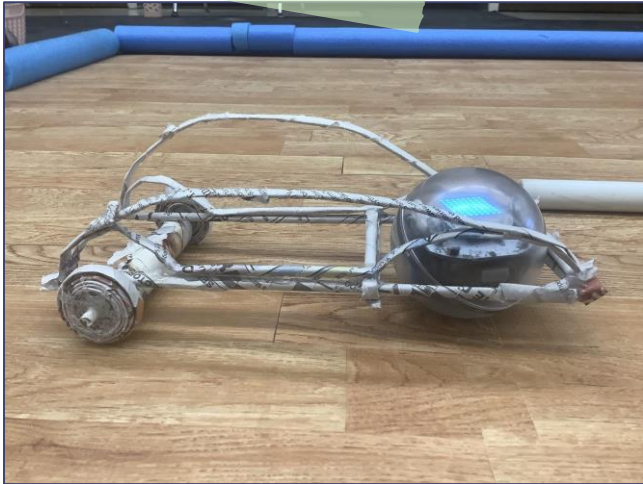
Profile of a Graduate:

Design & Product Creation

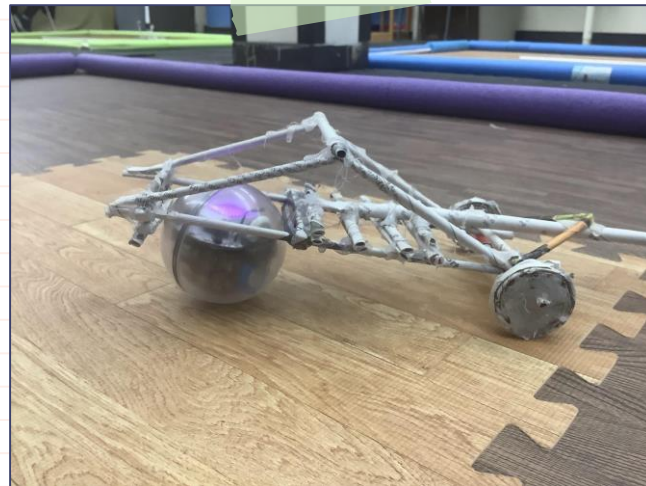
# Materials



# The Designs



# The Designs



# The Designs



# The Designs



# Code in All Shapes and Sizes

```
on start program
  set long to 3.985
  set short to 1.7500001
  matrix animation
  heading 270°
  loop 10 times
    stop
    roll heading + 90 at 110 speed for long
    delay for 1s
    stop
    roll heading + 90 at 110 speed for short
    delay for 1s
```

The image shows a Scratch script with the following blocks: 'on start program' (black), 'set long to 3.985' (pink), 'set short to 1.7500001' (pink), 'matrix animation' (green) with a 'loop' block (green), 'heading 270°' (teal), 'loop 10 times' (purple), 'stop' (teal), 'roll heading + 90 at 110 speed for long' (teal), 'delay for 1s' (purple), 'stop' (teal), 'roll heading + 90 at 110 speed for short' (teal), and 'delay for 1s' (purple). The script is placed on a lined background that resembles a notebook page.

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

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

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

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

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

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

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

```
define t3L3
  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
```

# Madison Public Schools Performing Arts Program



Looking to the future...







# Profile of a Graduate

Where do the Performing Arts fit?



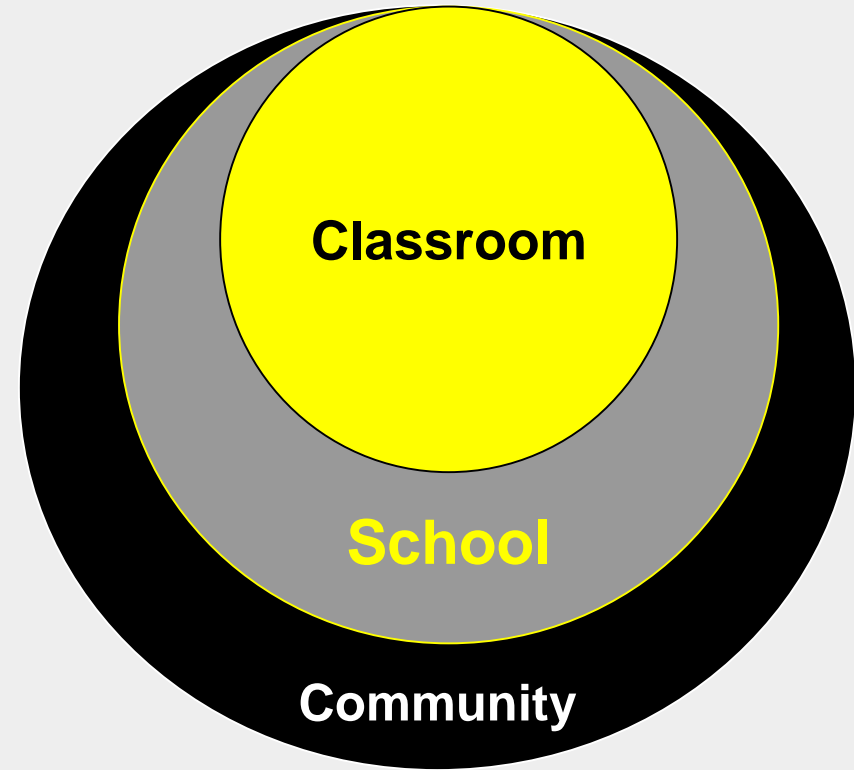
- **Critical Thinking**
  - Analyzing
- **Creative Thinking**
  - Design
- **Collaboration/Communication**
  - Product Creation



**Classroom:** How can educators provide the support and facilitation needed to allow students to participate in developing their own learning experiences?

**School:** How can schools bring students into the process of identifying a diverse and comprehensive set of learning opportunities?

**Community:** How can we work together to build a dynamic, culturally responsive arts community prepared to hear, support, and validate the needs of students at critical transition points?



- **How do we assess what is next?**
  - **Where are we headed?**
  - **How do we get there?**



**1. Achievement—the scope and depth of what students learn**

**2. Participation—how many students benefit from music classes**

**3. Impact—whether participating students are motivated and empowered to continue their musical involvement after moving to the next level**





- The percentage of students who elect high school ensemble classes has been declining steadily over the past several decades.
- **21 percent of US high school students currently elect BOC, a decrease of 10 percent in just the past ten years.**
- The strands of singing and playing ensemble instruments have long been a focus of school music programs in the United States.
- **Other strands, such as harmonizing instruments (guitar, piano) and music composition, have existed outside K–12 schools for centuries, but only recently have become widespread in school curricula.**





- **There has been an increasing popularity of music composition, facilitated by software and other technologies, that enable students to explore and express musical ideas with an ease that could not have been imagined only twenty years ago.**
- **Students highly involved in theatre are more likely to be reading at a high level of proficiency by grade 12.**
- **Young children taught in theatre arts integration classrooms have higher attendance rates.**
- **A study of Nobel Prize winners in science revealed that most have arts related hobbies.**
- **Theatre can help young students build understanding of scientific practice concepts.**

# How do we choose our courses and offerings?

- 1. Will the courses appeal to students who are not already electing to participate in a performing group?**
- 2. Will the courses provide opportunities to teach a variety of standards, including listening and creating?**
- 3. Will student participants find opportunities to continue their involvement after graduation?**
- 4. Will the courses also provide a vehicle for expanding students' musical tastes, or at least making them more receptive to alternative musical styles.**
- 5. Are their options for full year and trimester long courses at the high school level?**



**How do we then provide the proper foundation to be able to offer these experiences at the middle school and high school levels?**



# Where are we now?

Professional Development

EduPlanet

Student Focus Groups

Scope and Sequence

Vertical Alignment

# What's next?