Beyond Prompt Engineering

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ENGAGED QUALITY INSTRUCTION THROUGH PROFESSIONAL DEVELOPMENT

EQuIPD

University of Florida

June 21st, 2025

Scan for Resources

https://bit.ly/EQuIPDASEE25

Take a Moment to Get Connected!

WiFi: **ACEG2025**

Password: **POLYTECH2025**

Scan for Workshop Resources

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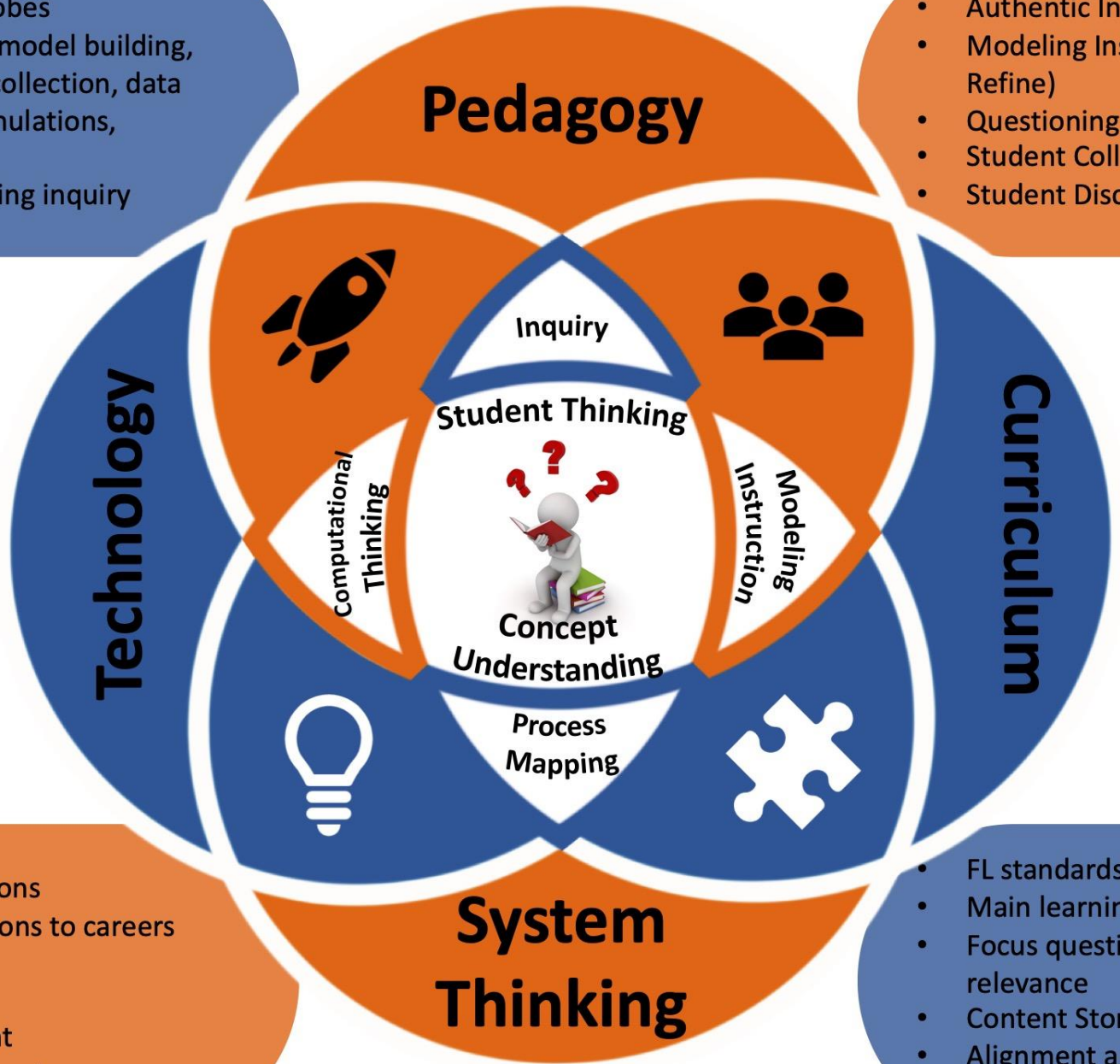
- Student use of sensors and probes
- Student use of technology for model building, computational thinking, data collection, data analysis, data visualization, simulations, programming
- Student use of technology during inquiry

- Authentic Inquiry
- Modeling Instruction (Elicit, Develop, Deploy, Refine)
- Questioning (Elicit, Probe, Challenge)
- Student Collaboration
- Student Discourse

Engaged Quality Instruction through Professional Development

UF Herbert Wertheim College of Engineering UNIVERSITY of FLORIDA

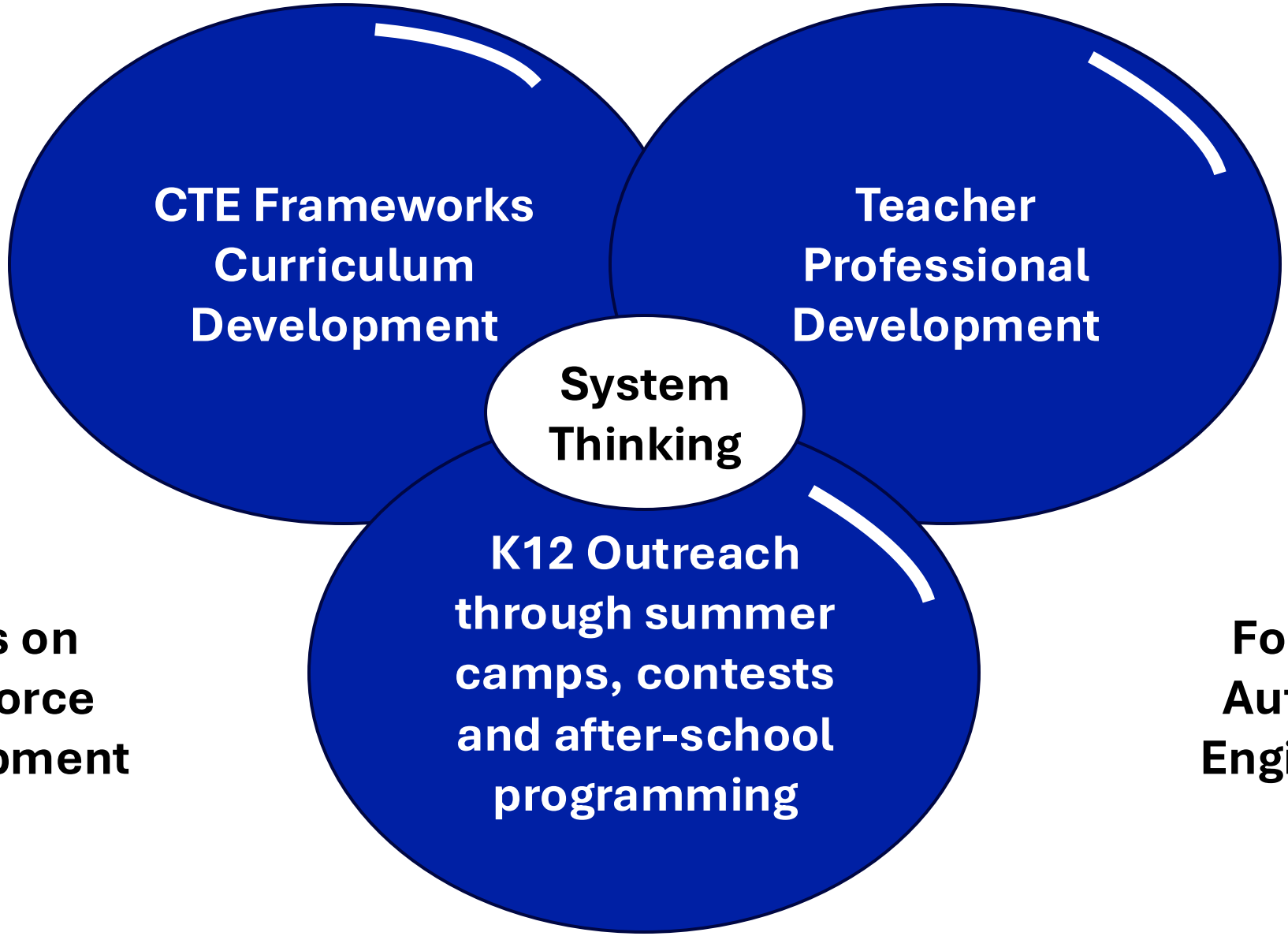


- Authentic Workforce Applications
- Real-world problems/connections to careers
- Engineering Design
- Process Mapping
- Ongoing Formative Assessment
- Authentic Summative Assessment

- FL standards linked to core conceptual models
- Main learning goal to align lesson to model
- Focus questions to provide engagement and relevance
- Content Storyline
- Alignment and sequencing of activities to support model development

Focus on Workforce Credentials

Focus on Pedagogical Practices



Focus on Workforce Development

Focus on Authentic Engineering

MATHWORKS HIGH SCHOOL AI SUMMERcamp

PTC Powering the Community

RURAL SCHOLARS SUMMER PROGRAM

EQuIPD K-12 Programs

GGEE Goldberg Gator Engineering Explorers

2024

370 Student Participants

13 Counties, 31 Camp Sessions

20 Local Teachers, 22 Engineering Mentors

2023

319 Student Participants

8 Counties, 22 Camp Sessions

20 Local Teachers, 20 Engineering Mentors

2022

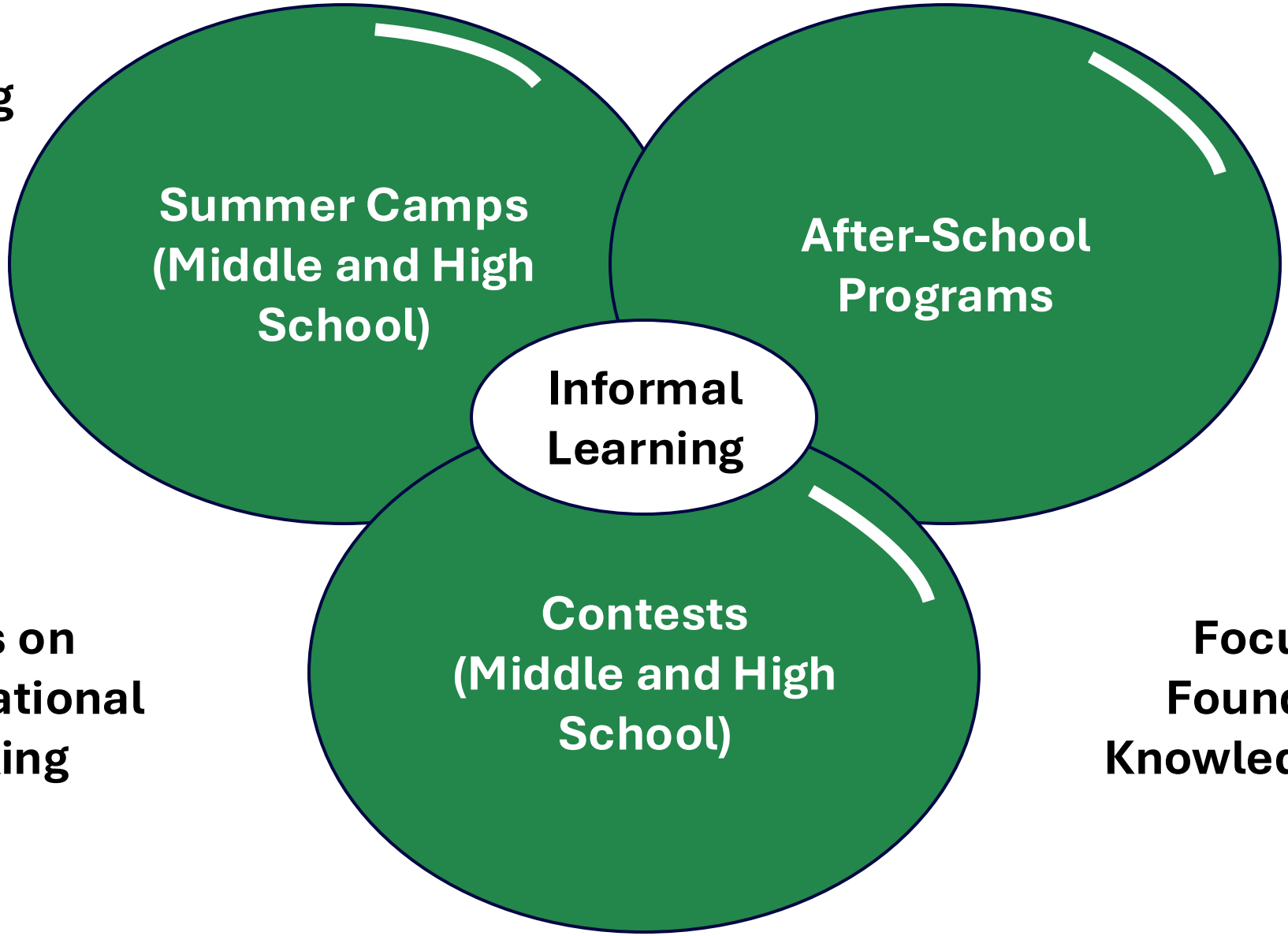
110 Student Participants

6 Counties, 8 Camp Sessions

4 Teachers, 6 Engineering Mentors

Focus on Engineering Design

Focus on Authentic Engineering



Focus on Computational Thinking

Focus on Foundation Knowledge for AI

EQuIPD Camp Overview

Planning	Curriculum	Training	Facilitation

• Dates
• Formats
  • 4 full-days
  • 8 half-days
• Agreements
• Materials
• Locations
• Meals
• Etc.
	• Choose program
	• Grade Band
	  • Middle
	  • High
		• Teachers & Undergrad Facilitators
		• 8 hours of training
			• Teachers and Undergraduate Mentors Lead Camp
			• Support from EQuIPD Team

Resources and Summer Camp Materials for Use in Educational K-12 Programs

- **GGEE Summer Camps** -Funded by partnerships with districts and Foundational Donors.

- **Minecraft Pilot Curriculum** – Funded in summer camps through Foundational donors in partnership with districts through UF/Microsoft Minecraft Education partnership.

- **MathWorks Matlab Summer Camps** – Funded by MathWorks.

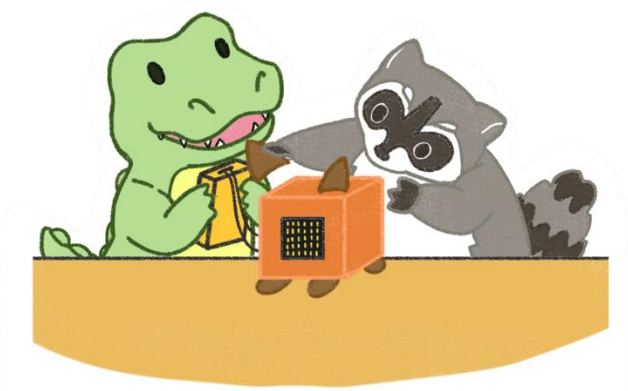
Goldberg Gator Engineering Explorers

Introductory and Advanced Programs

Goldberg Gator Engineering Explorers

- The Goldberg Gator Engineering Explorers (GGEE) Summer Program was designed to provide middle school students with an authentic experience in programming, engineering design, and computational thinking.
- The Introductory Program experience is focused on programming Micro:bit microcontrollers and developing creative products for design challenges by programming the Micro:bits.
- Advanced Programs focused on building a basic understanding of Artificial Intelligence and Machine Learning

Summer Program Goals



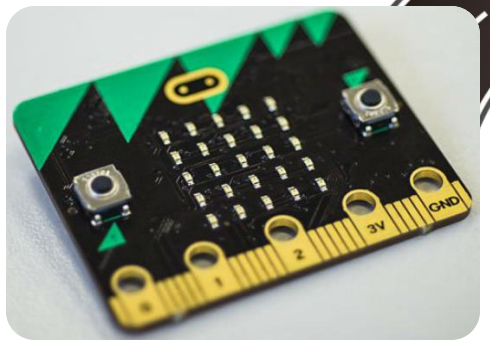
Students will…

- gain experience with computer science in a variety of real-world applications
- be interested and be able to solve real-world problems using computational thinking practices
- engage with diverse students in practices that mirror the real-world work of engineers and scientists
- be mentored by like and near-peer college students
- be empowered to pursue careers in computer science

INTRODUCTORY PROGRAM ROADMAP

Day 1 (1-2)

Introductions
Programming Basics
Applications



BBC Micro:bit

Elicit to Develop

Day 2 (3-4)

Micro:bit Pet Design Challenge

Develop to Deploy

Day 3 (5-8)

Technical Design Challenge: Empathize, Define, Ideate, Prototype 1, Test, & Refine

Deploy to Refine

Day 4 (5-8)

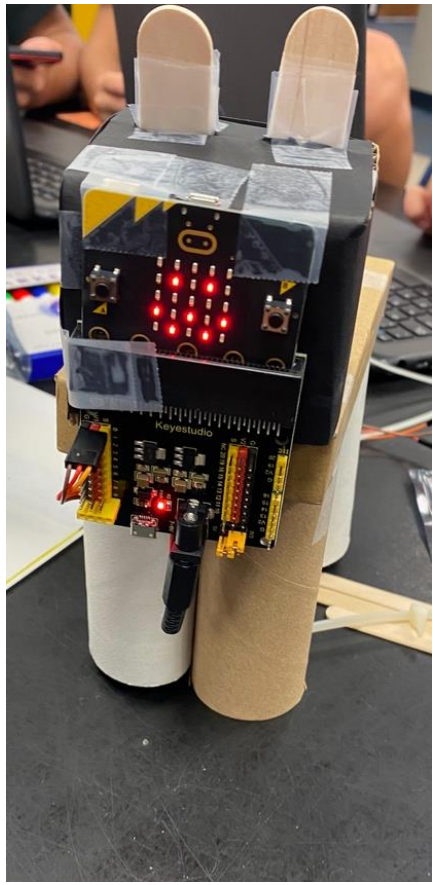
Technical Design Challenge: Prototype 2, Test, Refine, Final Design

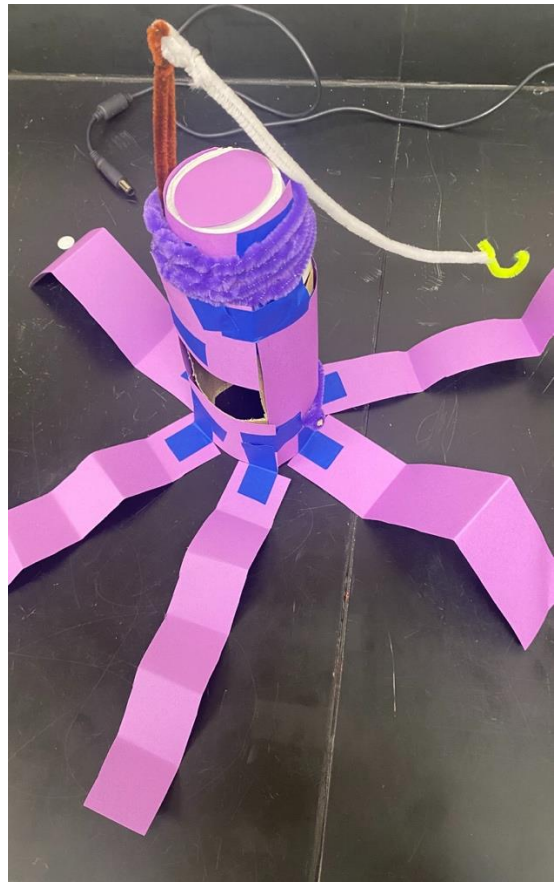
Refine to Present

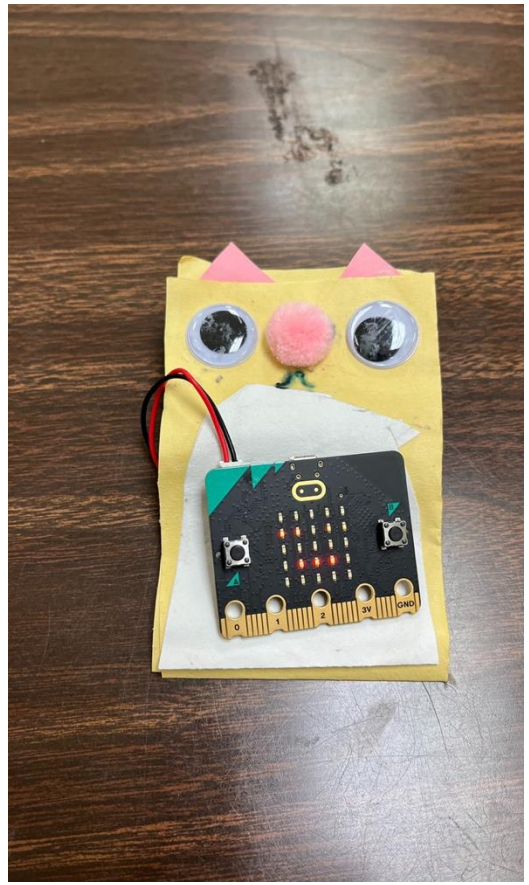
Day 4 (8)

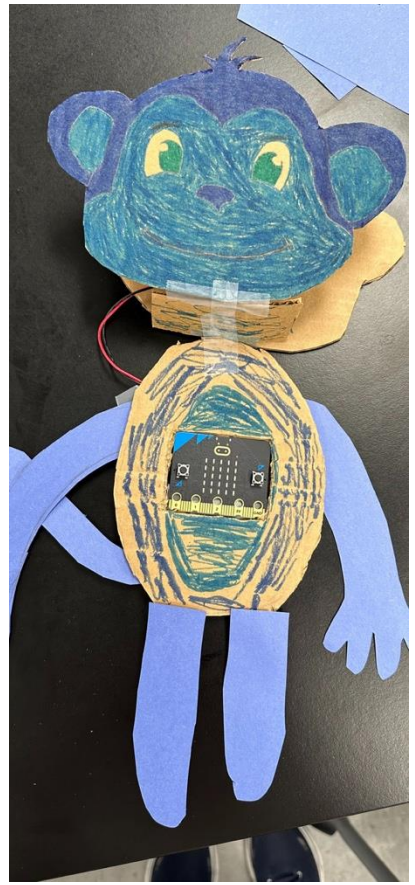
Final Design Pitch Presentations

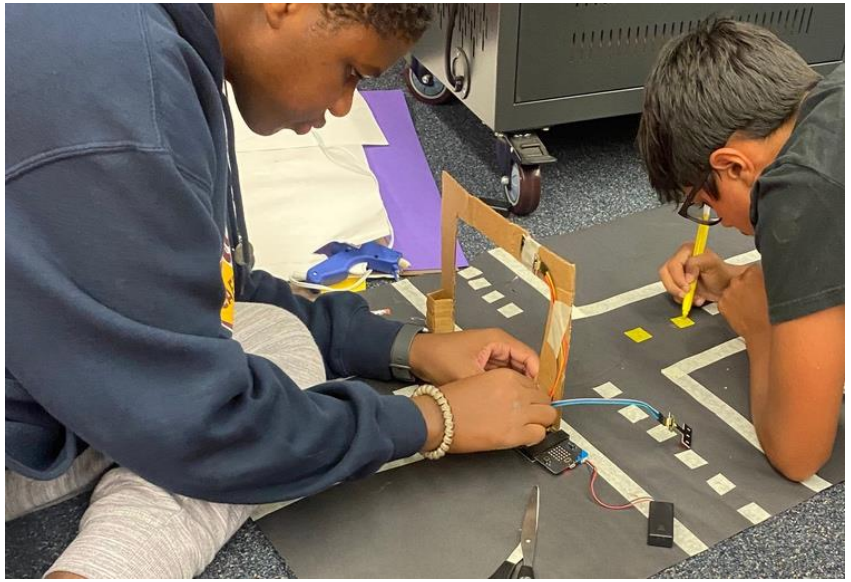
Micro:bit Pets



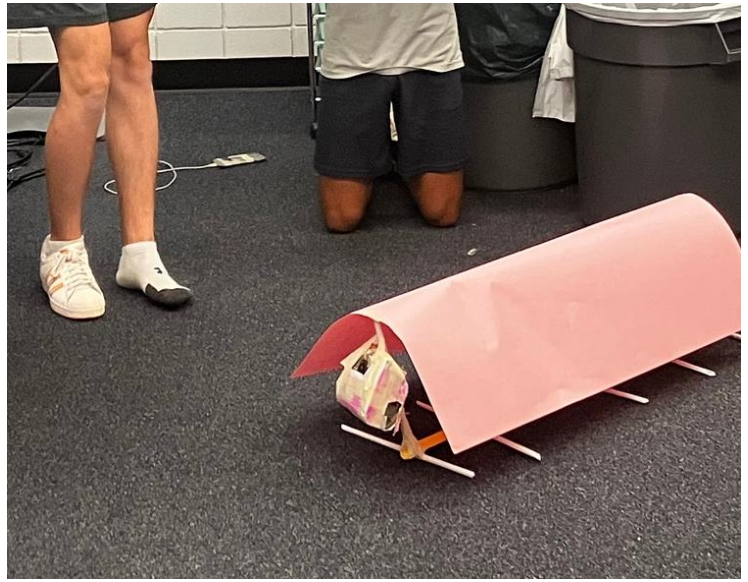




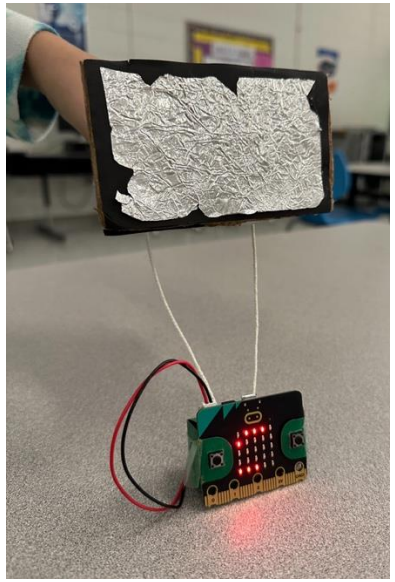




Remote-controlled traffic light for emergency vehicles



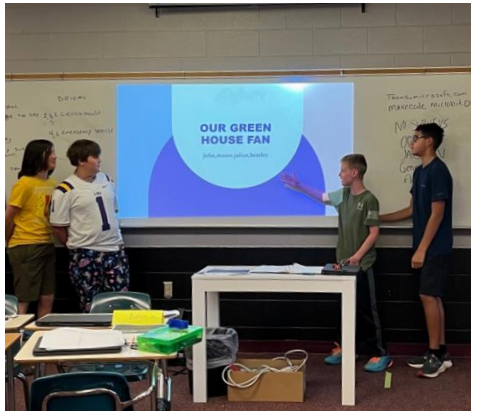
Greenhouse monitoring system for farmers

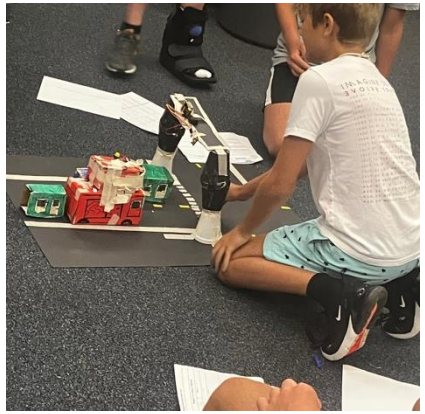


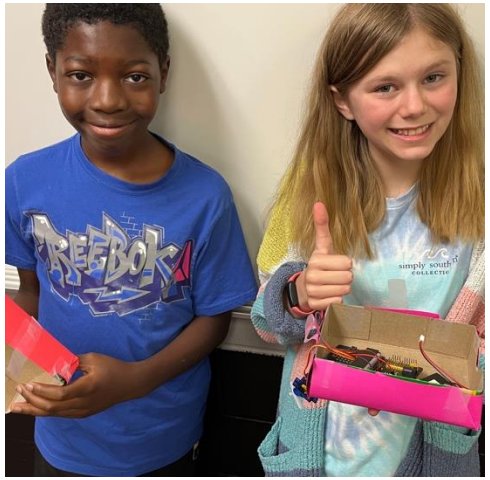
Safe driving indicator for new drivers

Technical Design Challenge Themes

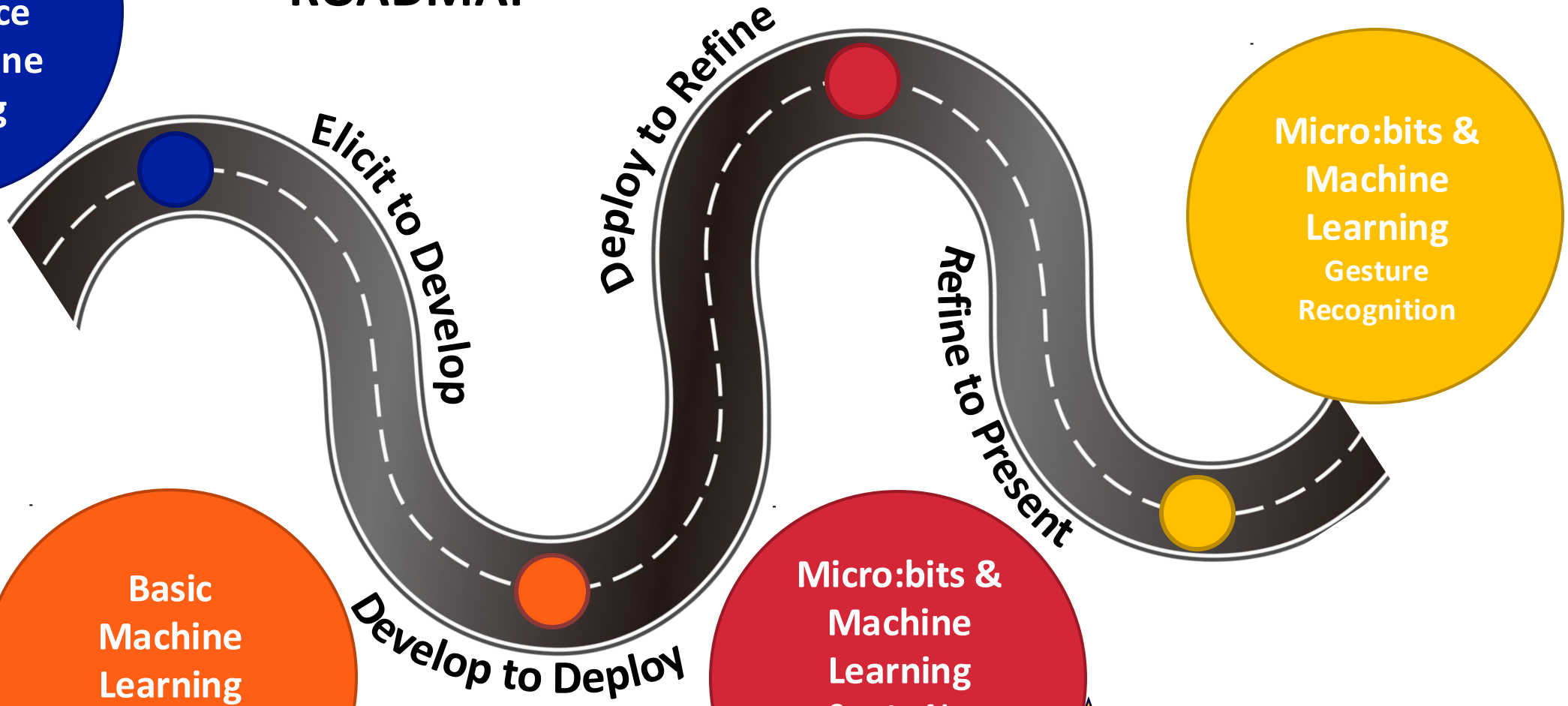
Technical Design Challenge Examples



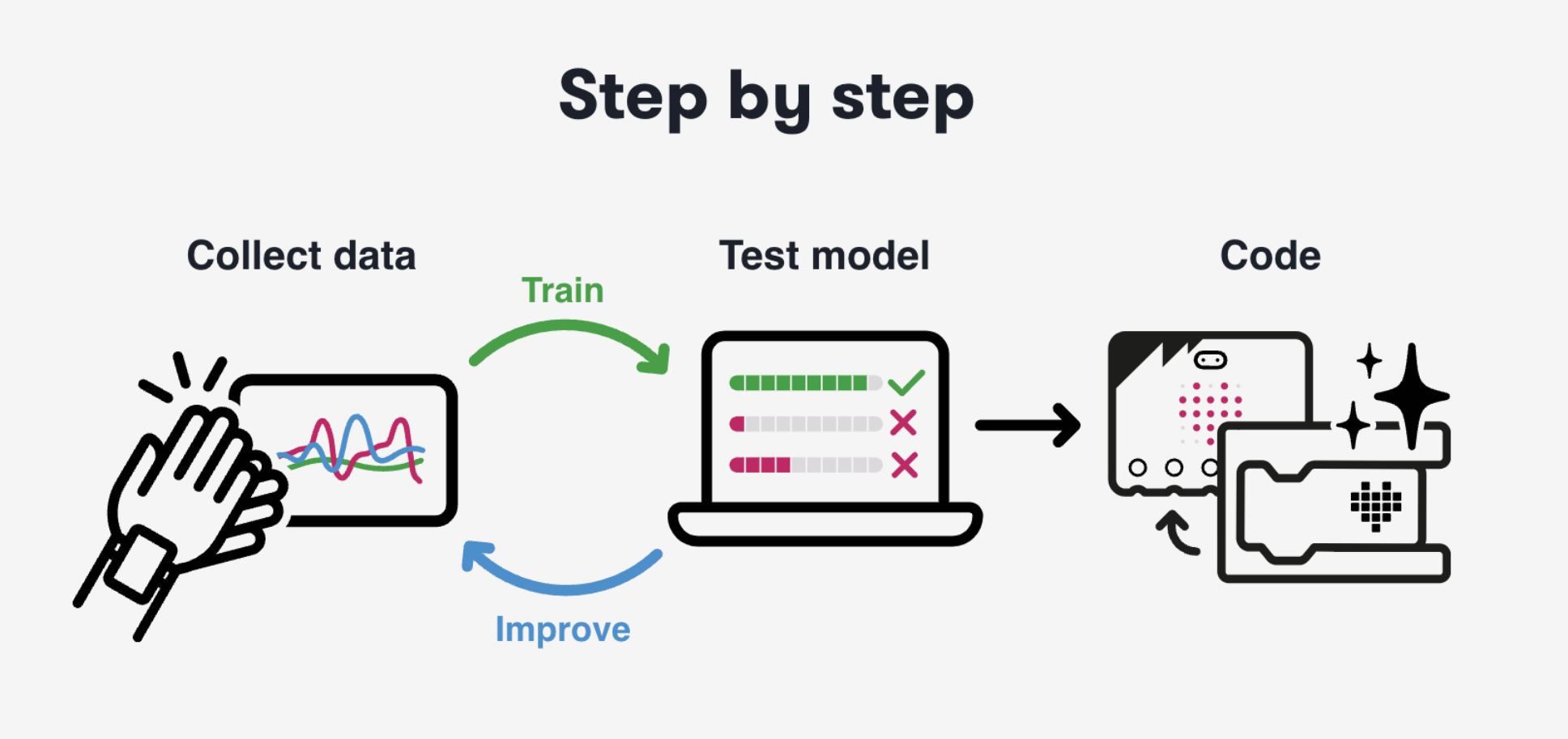




ADVANCED PROGRAM ROADMAP

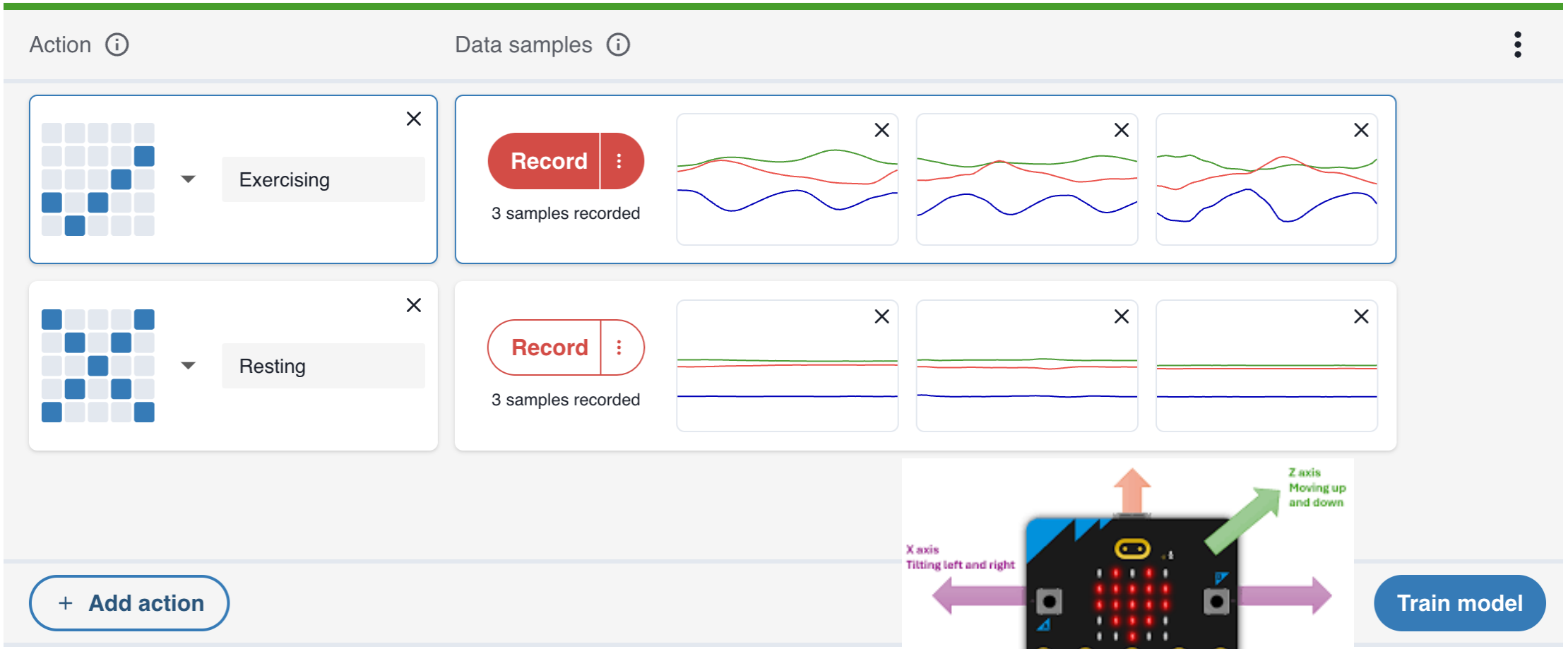


Create AI – Machine Learning & Micro:bits



https://createai.microbit.org/

Create AI – Machine Learning & Micro:bits



https://createai.microbit.org/

Scan for Resources

https://bit.ly/EQuIPDASEE25

Rock Paper Scissors

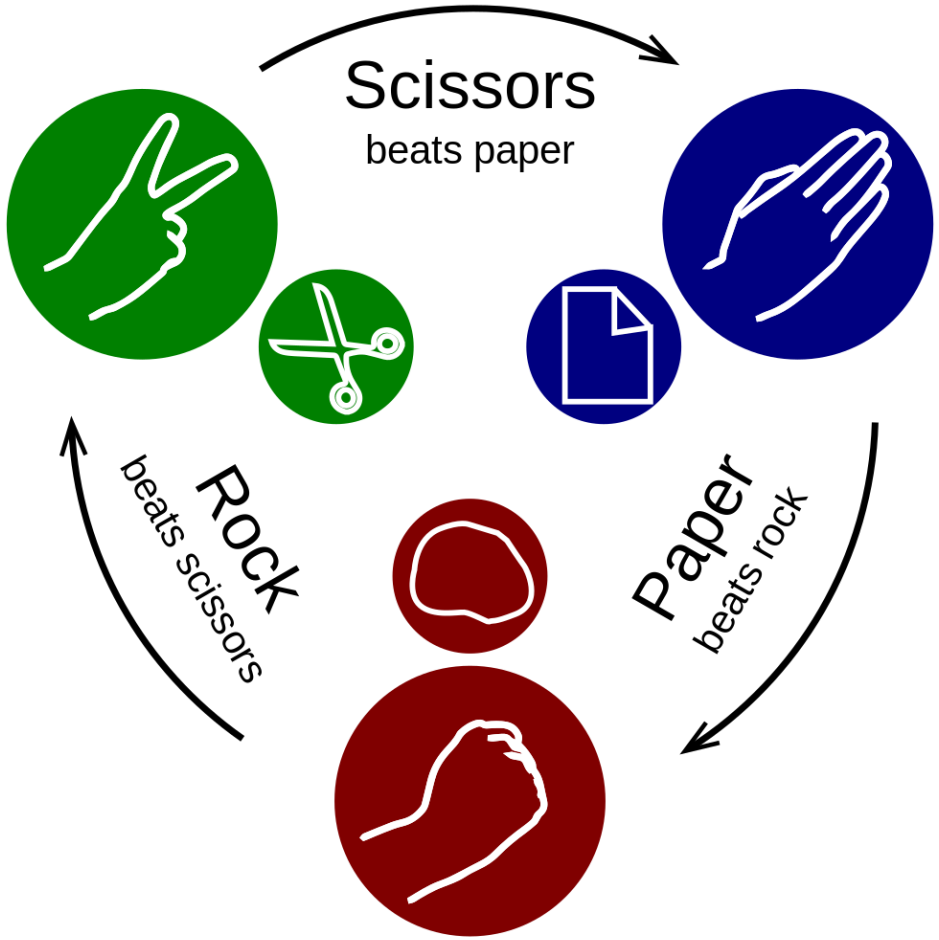
Micro:bit Activity

Join along on makecode.microbit.org

Rock Paper Scissors

WHO HAS PLAYED ROCK PAPER SCISSORS BEFORE?

- Turn to a partner and play a match
- After you play a round, with your partner
  - What are the steps to the game?
    - Start, Middle, End
  - Are there any rules? What are they?

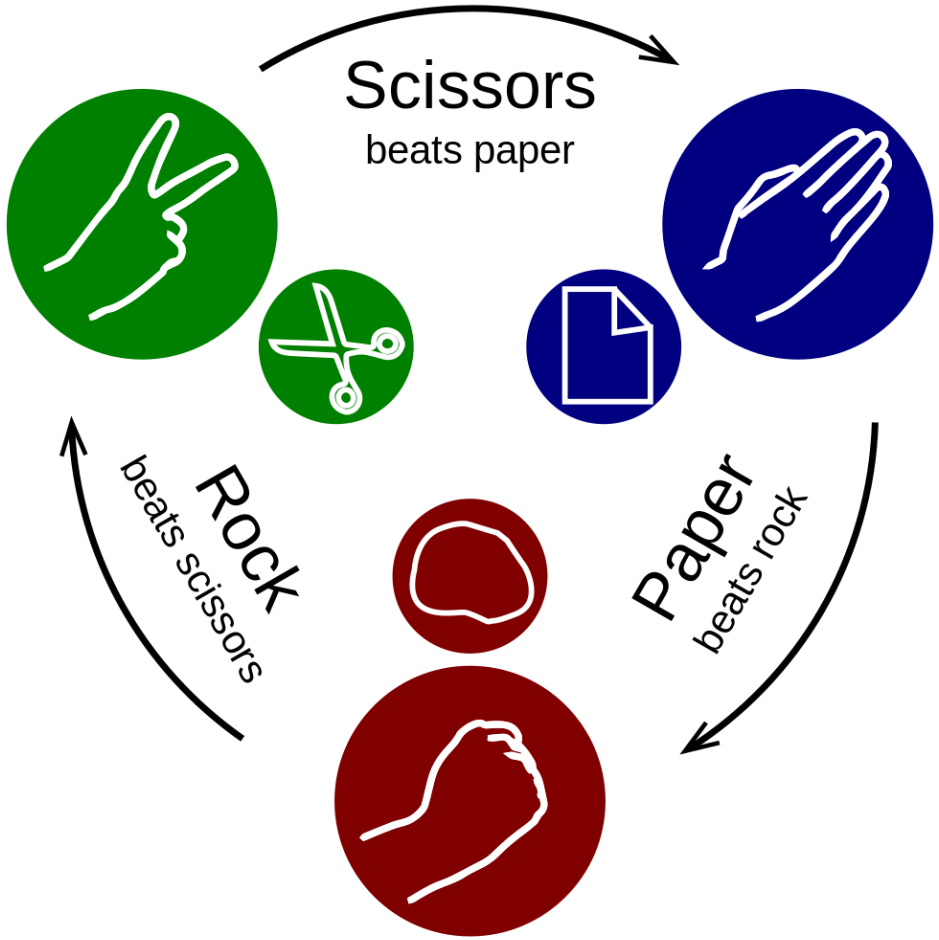


Game-Making: Rock, Paper, Scissors

We are going to program our Micro:bits to play Rock, Paper, Scissors against us!

Game Requirements:

1. Micro:bit needs a countdown to start playing the game – just like you say "Rock, Paper, Scissors, Shoot!"
2. Micro:bit needs to randomly choose between Rock, Paper, or Scissors
3. Micro:bit needs to display an icon for Rock, Paper, or Scissors
4. Micro:bit needs an input to know when to start the game

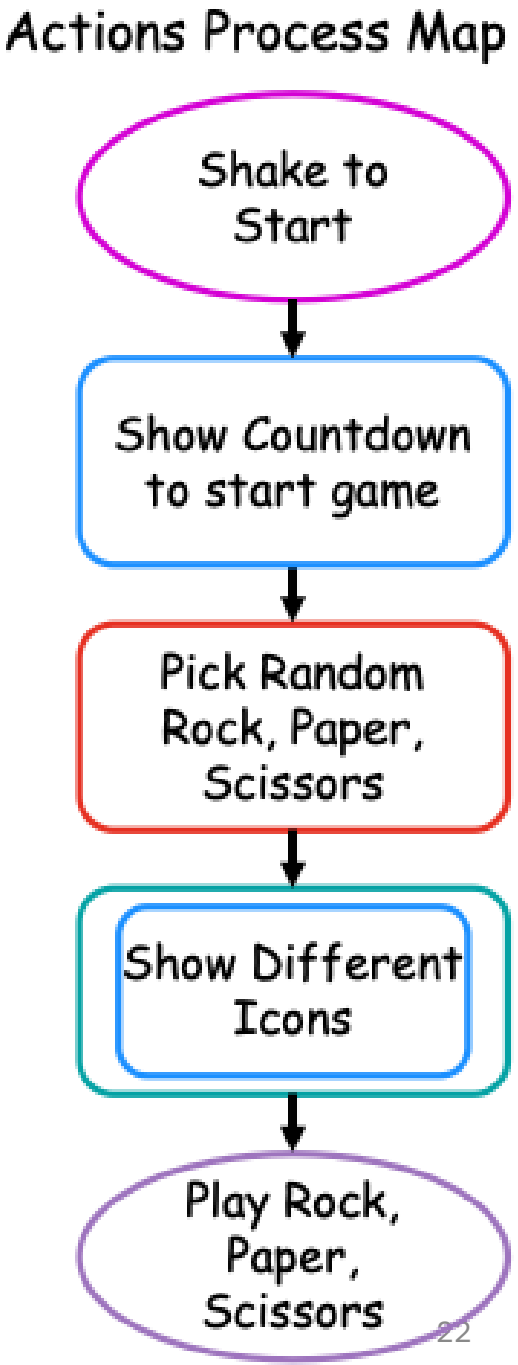


Process Mapping: The Big Actions

Using the parts and rules of Rock, Paper, Scissors, you wrote down with your partner, let's walk through an ACTIONS process map together

COMPARE the steps you wrote with the process map on the slide.

- Are the steps similar?
- How are they different?
- Is the order of the steps the same?

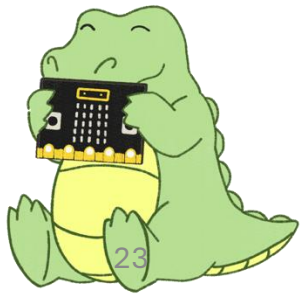


Process Mapping – Coding Rock, Paper, Scissors

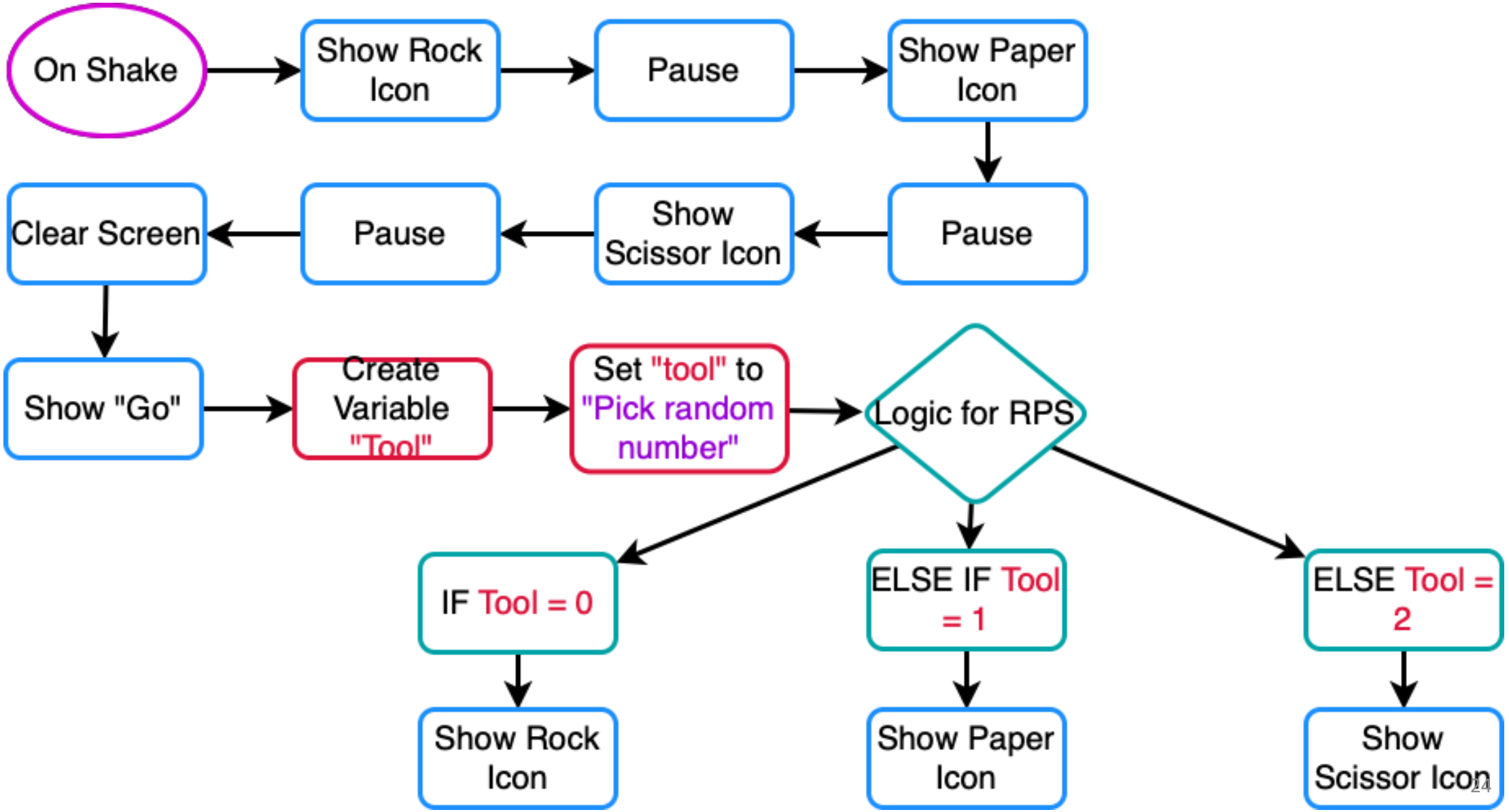
You Do: Now, it's your turn to create your rock, paper, scissors process map. You will need to follow the program requirements found below as you create your process map.

Program Requirements

1. Micro:bit needs a countdown to start playing the game – just like you say "Rock, Paper, Scissors, Shoot!"
2. Micro:bit needs to randomly choose between Rock, Paper, or Scissors
3. Micro:bit needs to display an icon for Rock, Paper, or Scissors
4. Micro:bit needs an input to know when to start the game

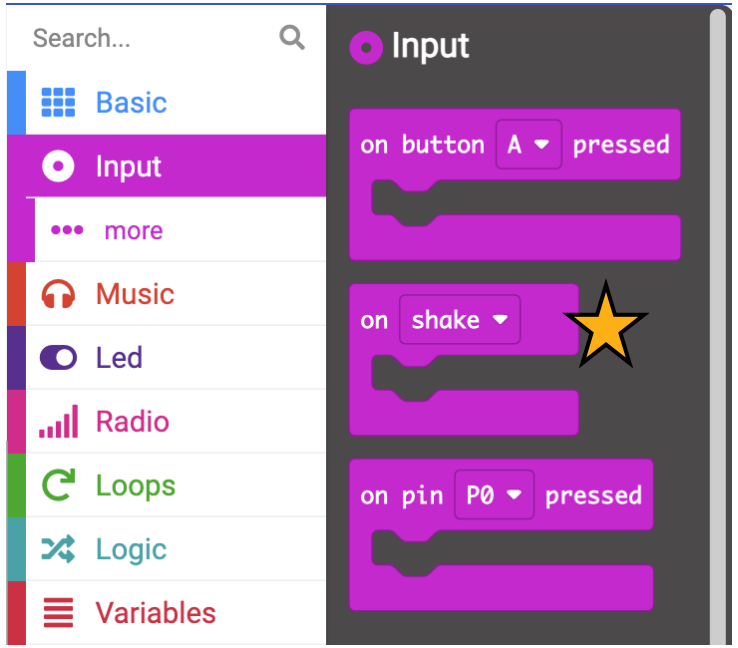


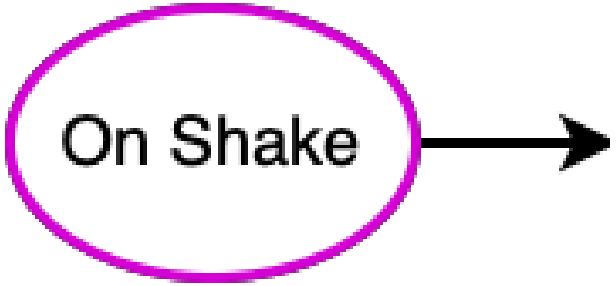
Process Map


On Shake
Show Rock Icon
Pause
Show Paper Icon
Pause
Show Scissor Icon
Pause
Clear Screen
Show "Go"
Create Variable "Tool"
Set "tool" to "Pick random number"
Logic for RPS
IF Tool = 0
Show Rock Icon
ELSE IF Tool = 1
Show Paper Icon
ELSE Tool = 2
Show Scissor Icon

Starting Rock Paper Scissors

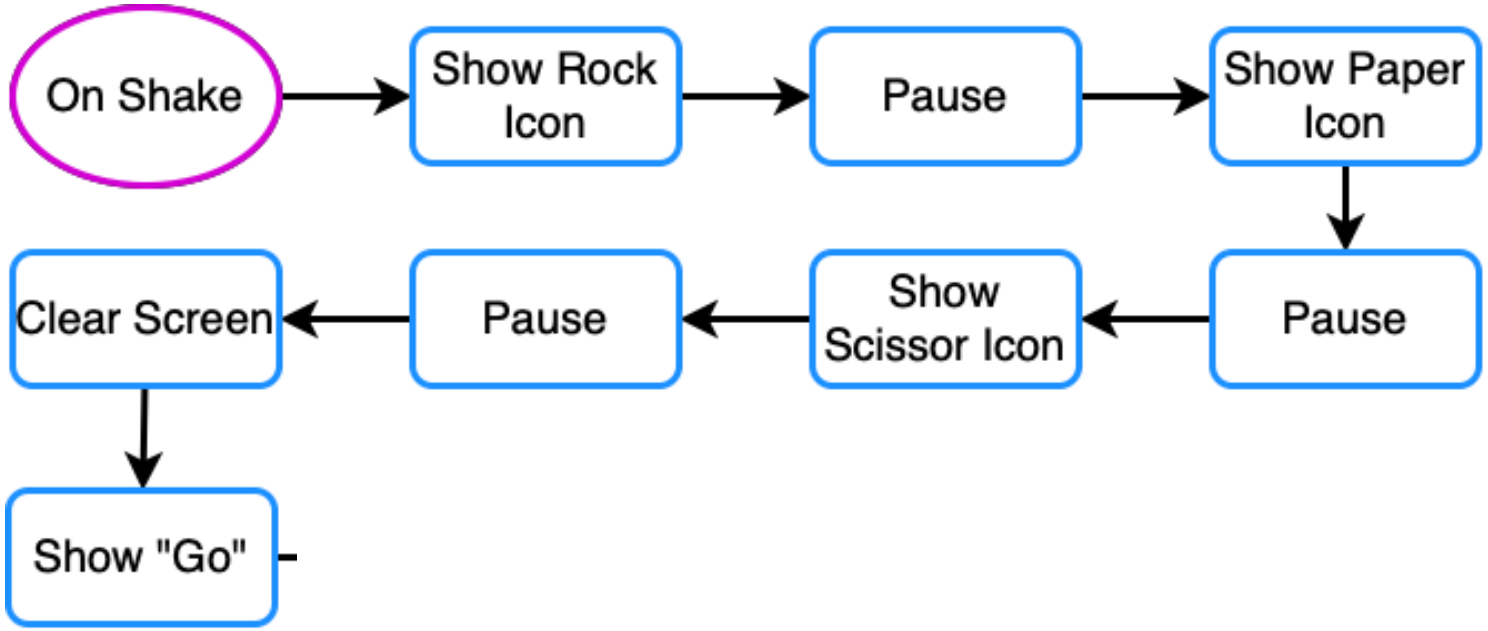
1. Open MakeCode
   - **https://makecode.microbit.org/**
2. Log in so you can save your work
3. Start a new project
   - Name it “Rock Paper Scissors”
4. Code Input “On Shake”
   - Open Inputs
   - Choose Input “on shake”

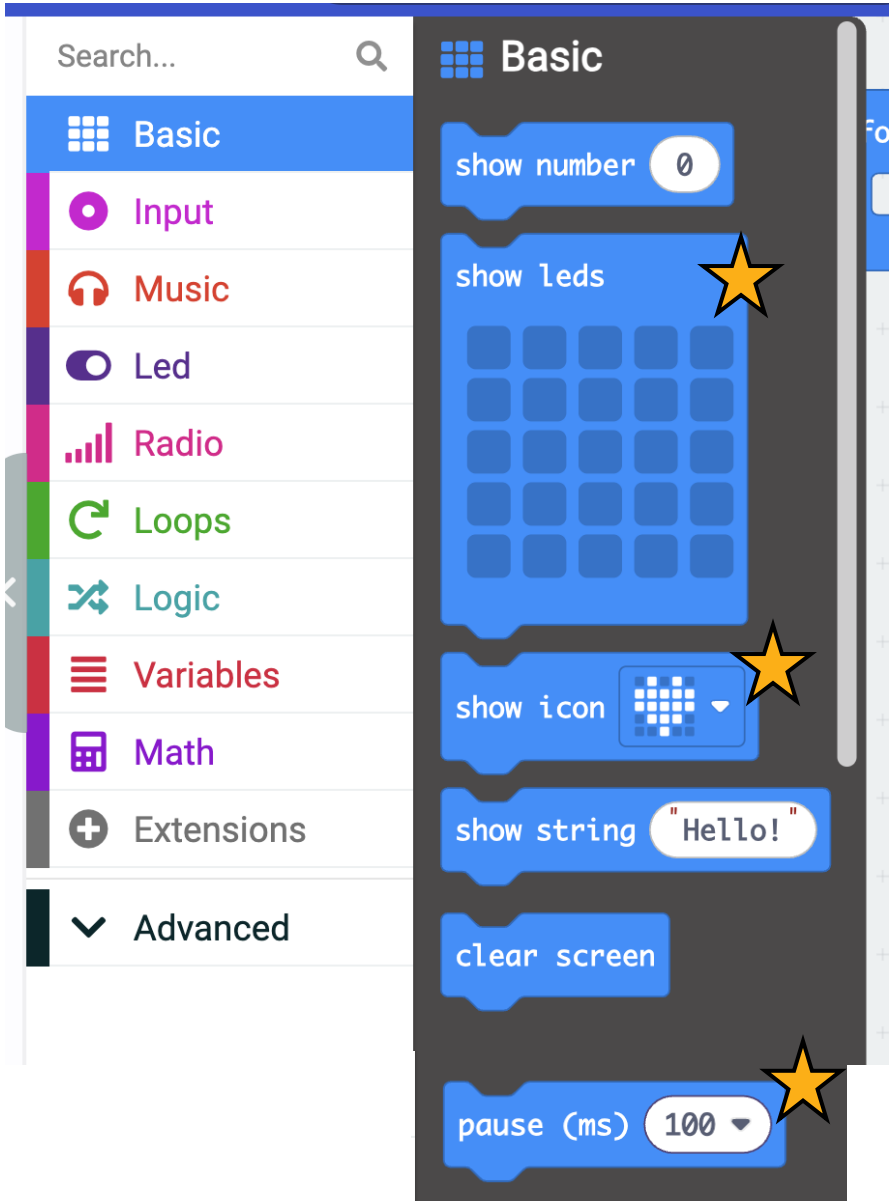




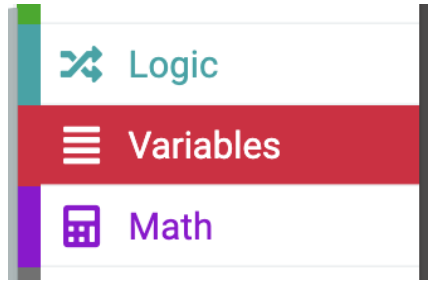
Rock Paper Scissors: Countdown

5. Start the countdown with different icons
   - Show Icon
   - Pause
   - Repeat



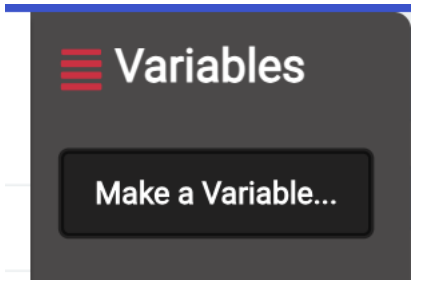


Making a Variable



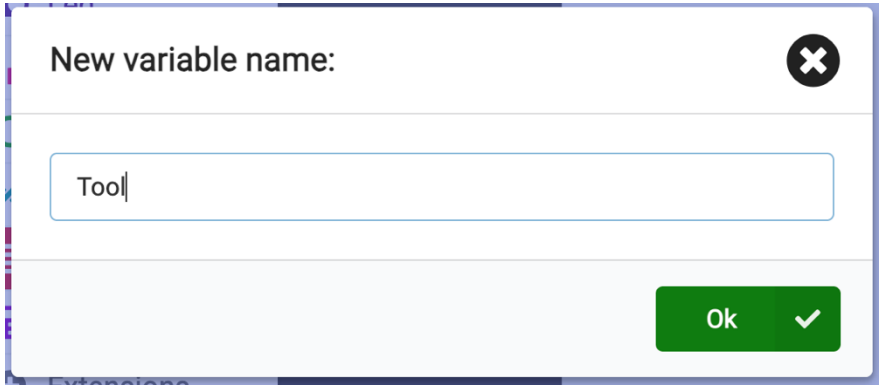
1

2



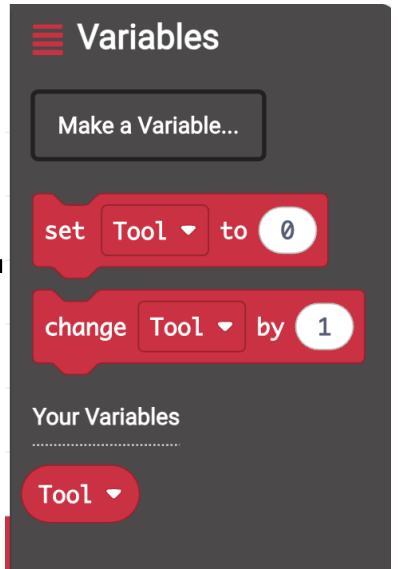
6. You can create a variable using the red variable blocks
   - Open Variables
   - Click “Make a Variable…”
   - Name your Variable: Tool

3



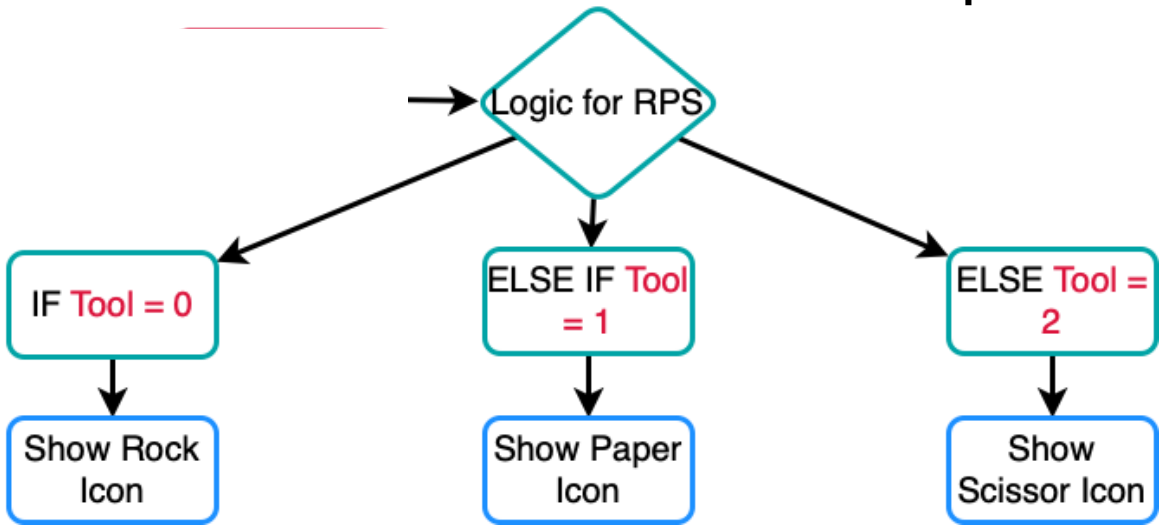
7. Use Math blocks to set Tool to a random Number 0-2
   - (3 numbers for 3 options RPS)

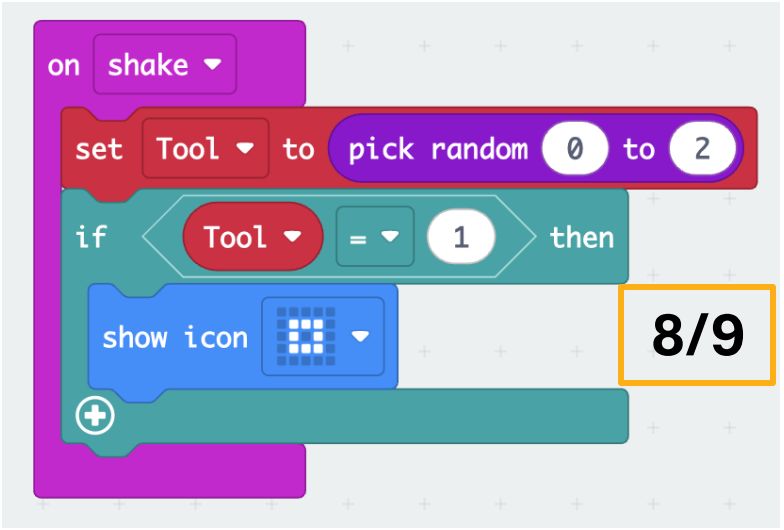
4

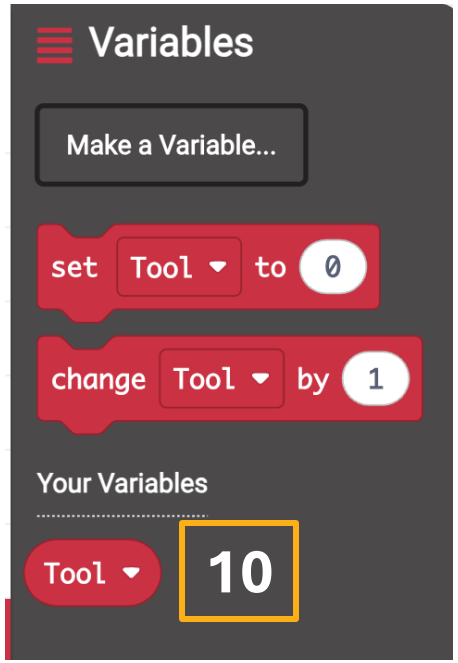


Conditional Statements

8. Click on the “Logic”
   - Under Conditionals
   - Choose the “if <true> then” conditional statement
9. Add the “0 = 0” Comparison to the conditional statement
10. Add Variable Tool set it equal to 1

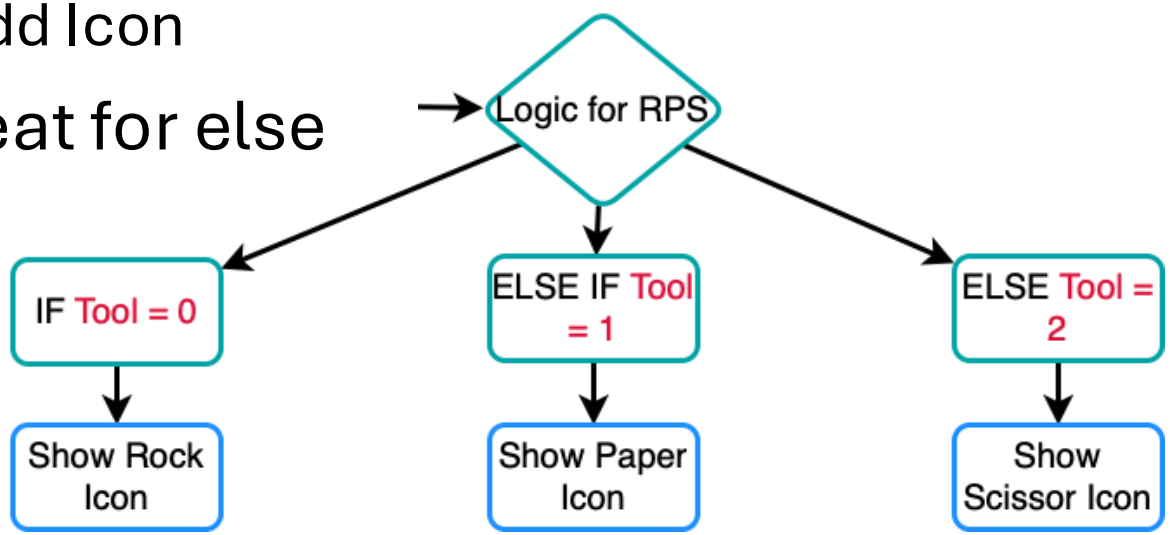


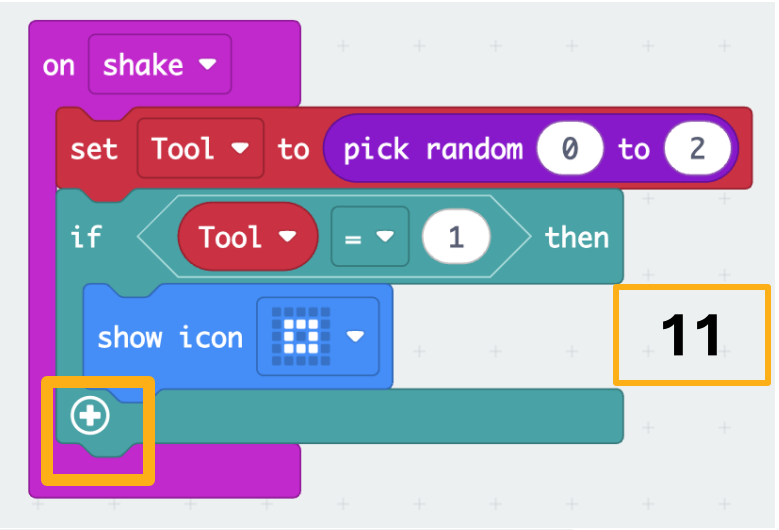


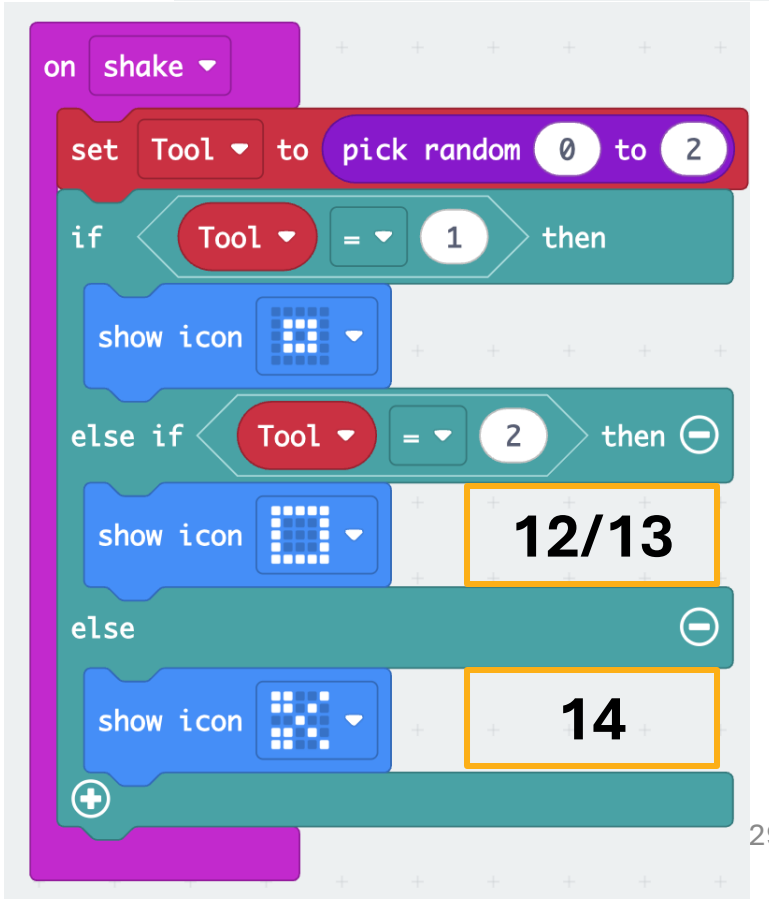


Conditional Statements

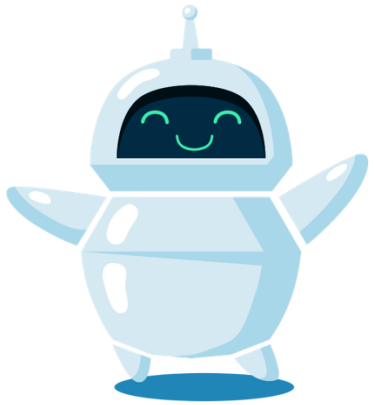
11. Use the “+” symbol on the conditional statement to add an elseif and else condition
12. Add the “0 = 0” Comparison to the conditional statement
13. Add Variable Tool: Set it equal to 2
    - Add Icon
14. Repeat for else

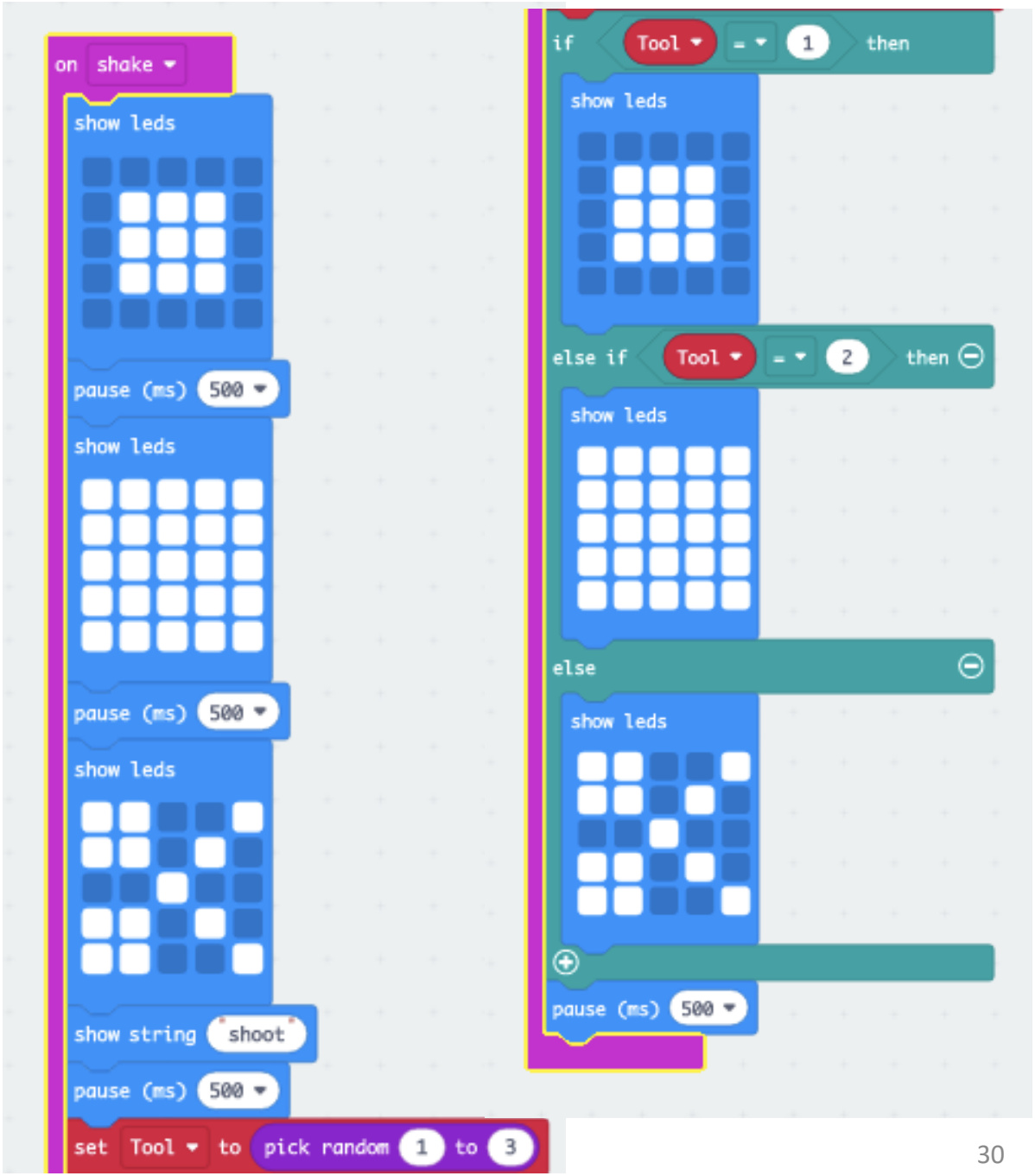






Example Final Code





Rural Scholars Summer Program

Rural Scholars Summer Programs

- This middle school camp explores the role of AI and data in agriculture and explores the way smart farms work using sensors and probes to collect data.
- Scholars can also build smart farms and self-driving tractors.

Summer Program Goals

Students will…

- gain experience with data collection, data analysis, AI applications, and programming in a variety of real-world applications
- develop interest and ability to solve real-world agricultural problems
- engage in practices that mirror the real-world work of engineers and scientists
- be mentored by like and near-peer college students
- feel empowered to pursue careers in STEM and agriculture

Program Overview

Data Collection Basics

Using Sensors and Probes

- Micro:bits, Weather sensors, moisture sensors

Programming Smart Tractors to Collect Data

Data Analysis

- Analyzing
- Graphing
- Making Meaning

Build Tabletop Smart Farm Model

- AI and Sustainability
  - Sustainable Engineering
- Activity
  - Design a Sustainable Farm for the Village

Standards (Florida Middle School AI)

- **08.01:** Identify and describe current examples of AI applications in everyday life
- **08.02:** Identify and describe AI technologies students interact with frequently and determine what problems and/or needs the AI is intended to solve.
- **08.04:** Discuss how AI is and could be used to enhance areas of student interest, real-world problems, business needs, and the future of work.

Objectives

- Students will learn about sustainability and why sustainability is important
- Students will be introduced to the world of Minecraft and the problem statement for the village.
- Students will learn about sustainability and how AI technology can improve sustainability through solving problems and improving effectiveness.

Primary Learning Goal

- The purpose of this lesson is to introduce students to the idea of sustainability and the role AI can play in creating a more sustainable village in Minecraft.

Activity 1: Eliciting a Definition of Sustainability

Today we're going to talk about "sustainability", which is defined in the dictionary as:

noun: ***sustainability***
- *the ability to be maintained at a certain rate or level*
- *the pursuit of global environmental sustainability*
  - *avoidance of the depletion of natural resources in order to maintain an ecological balance*

Watch one of the following videos on Sustainability that best fits your class.

As you watch the video, think about how this definition applies to the video. What is sustainable in the video? Do people have to do something to make things sustainable? What do they have to do?

Jot down some ideas in your notebook.

What is sustainable development (cartoon 3:40) https://www.youtube.com/watch?v=7V8oFI4GYMY

This takes us back to our main project, where we have to create a sustainable village for our Minecraft community. Based on what you learned from the videos and reading about health and hunger, what does your village need to be sustainable? List at least five things below. You have been given an example to help you get started:

List of things in Minecraft for Sustaining…	**Health/Hunger/Both**
1. Making and growing a garden for food	both
2.	
3.	
4.	
5.	

Welcome! Sustainability City

For this activity, you will go and visit a Minecraft map called Sustainable City. There are several activities in that map you can visit as a class, but today we will look at Sustainable Food Production. In this lesson, you will learn about where food in your grocery store comes from, visit a local farm to see some sustainable farming practices, and then look at composting and recycling as part of what makes a village or city sustainable.

Welcome! Sustainability City

Let's Bring it Back to Rebuilding the Village!

If you are going to rebuild your village, which of these things would you have within your village? The example for the grocery store is filled in.

Item	Reasons to include it in your village	Reasons to not include it in your village
Grocery Store	People do not have to kill animals to sustain themselves; they can just buy food from the store.	People should have to work to get food by farming or finding animals.
Farm		
Smart Irrigation		
Cover Crops		
Farm Composting		
Recycling Facility		
Composting Facility		
Glass making and processing facility		

MathWorks High School AI

MathWorks High School AI Summer Camp

Two high school level summer programs

Music & Sports: an introduction to MATLAB, data analysis, AI, and machine learning through music and sports themes.

Hurricanes: Explore the world of hurricane and storm forecasting using AI and machine learning. Learn to analyze data & create machine learning models for hurricanes.

Summer Program Goals

Students will…

- gain experience with data analysis, AI applications through a choice of real-world applications
- use data from online sources – Spotify, weather, sports stats
- engage in practices that mirror the real-world work of engineers and scientists
- be mentored by like and near-peer college students
- feel empowered to pursue careers in STEM

Program Roadmap

Foundations of Data Analytics and MATLAB

- Introduce essential data analytics skills.
- Learn basic MATLAB syntax and operations, techniques for importing & managing datasets, data visualization, and how to access real-world data through APIs.
- Equip students to approach data analysis in a structured, informed way.

Introduction to AI and Machine Learning Concepts

- Fundamental AI and machine learning concepts:
  - How models make predictions
  - Ethical Considerations in AI
  - Real-world applications across fields.
- Connected to sports and music contexts

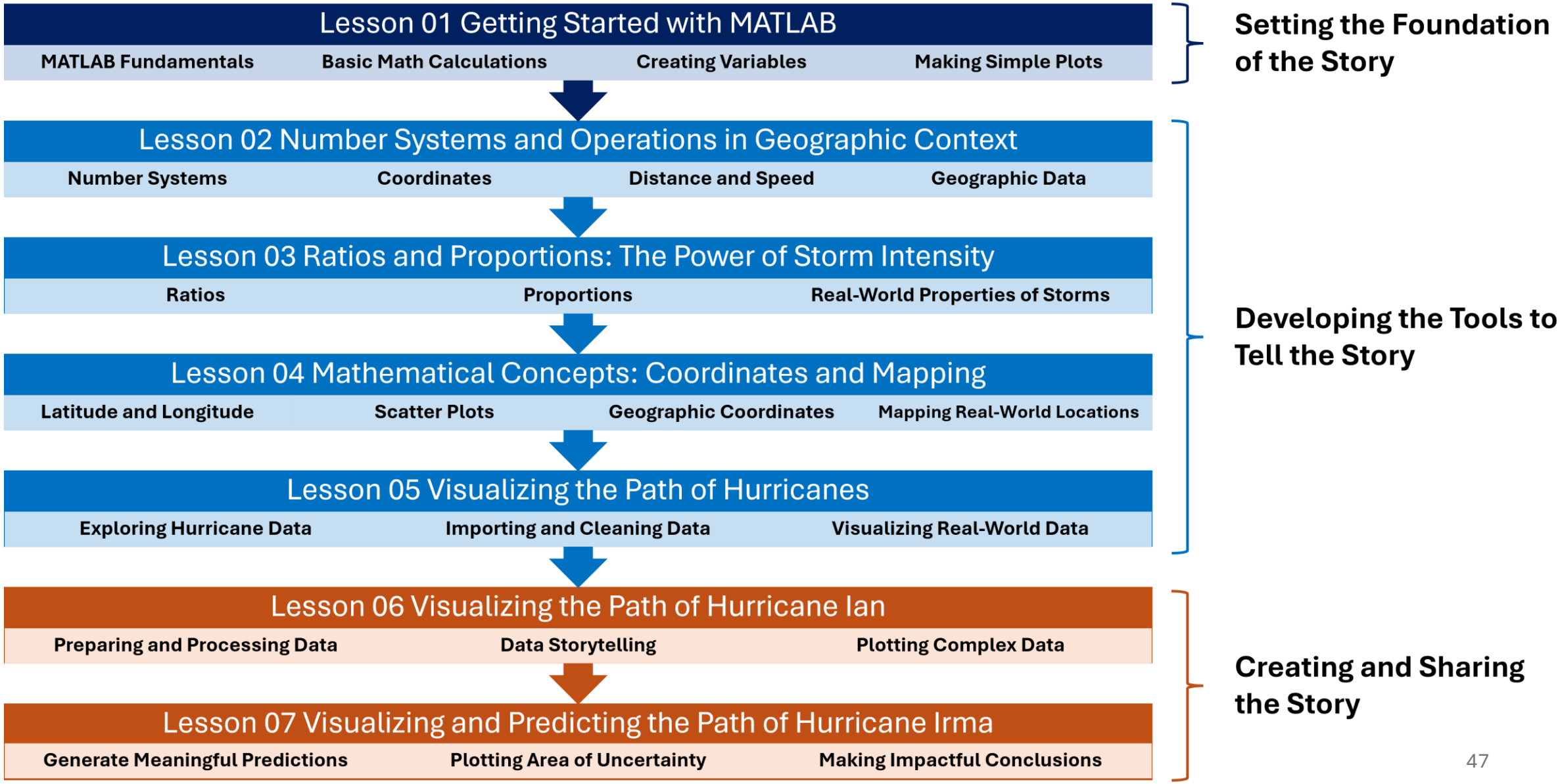
Applying Advanced Techniques in Data Analysis

- Advanced techniques
  - Image processing and MATLAB's AI toolkit to conduct deeper analyses.
- Practical applications
  - Analyzing visual data
  - Testing prediction models
  - Reinforcing their skills and preparing them for a final project.

Culminating Project: Predicting Future Stars

- Apply skills to predict future stars in sports or music.
- Using insights from their analyses, they present their findings and predictions, demonstrating their understanding of data analytics and AI in a practical context.

Hurricane AI Camps – Middle and High School



MathWorks Middle School AI Summer Camp

Image from Wikipedia

Lesson Overview

Objectives

- Use MATLAB to load and visualize real-world hurricane data.
- Understand how hurricanes are classified and how their paths are tracked.
- Learn how to create plots and maps to analyze hurricane data.

<u>These skills are super useful for analyzing things like weather data and even predicting hurricanes!</u>

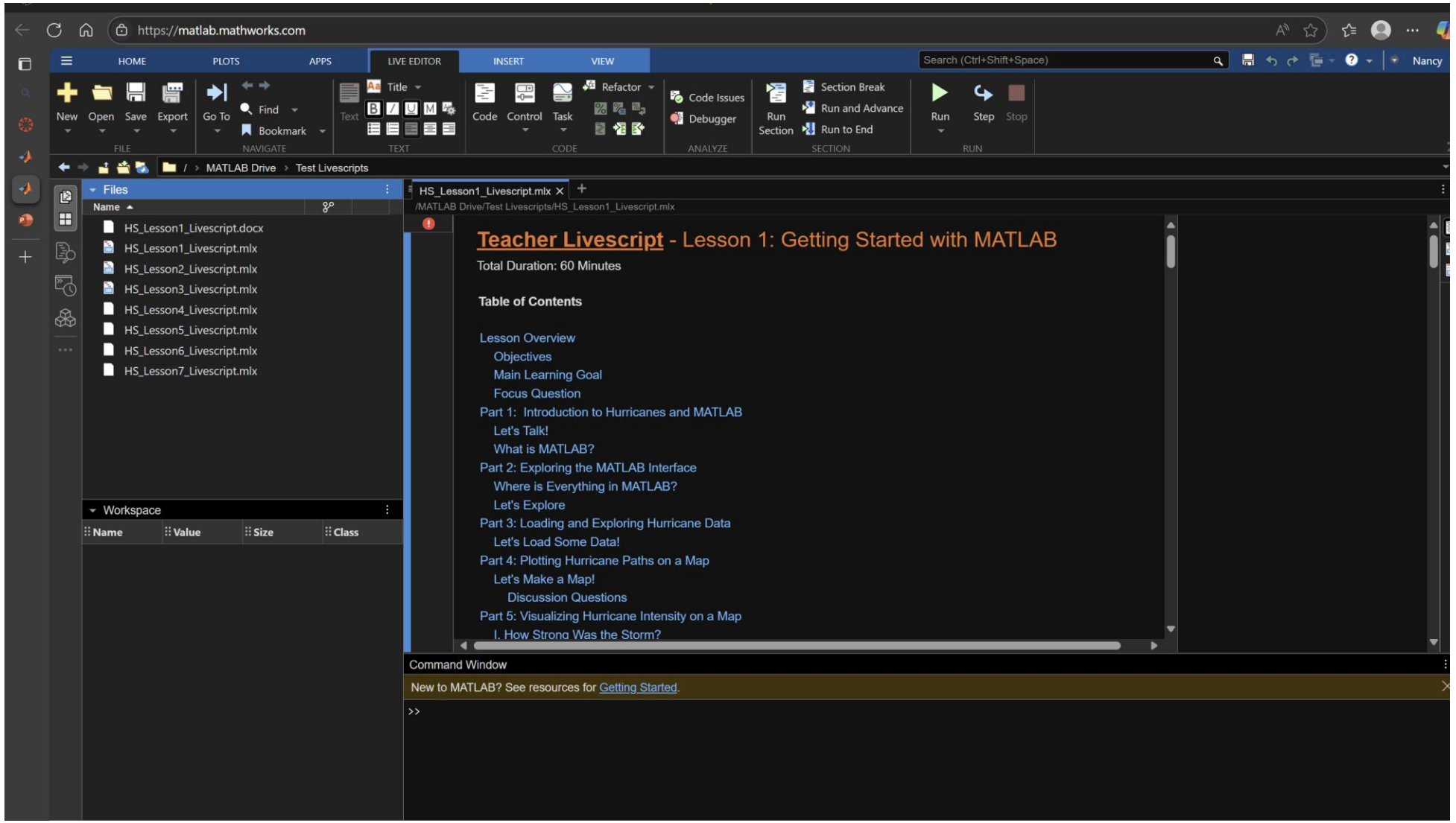
Main Learning Goal

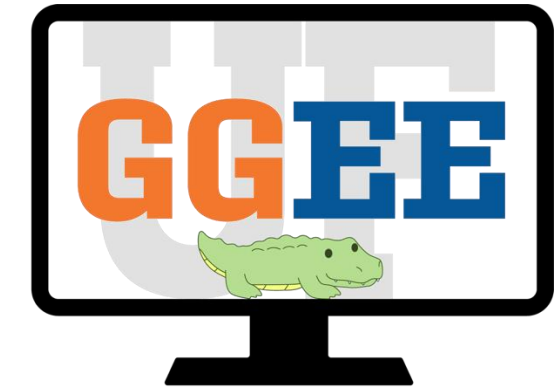
- This lesson introduces MATLAB as a tool for analyzing hurricane data. Students will explore how to manipulate and visualize data to understand hurricane paths and intensities.

Focus Question

How can we use MATLAB to analyze and visualize hurricane data?

Demo of Live Script





Questions on Programs?

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