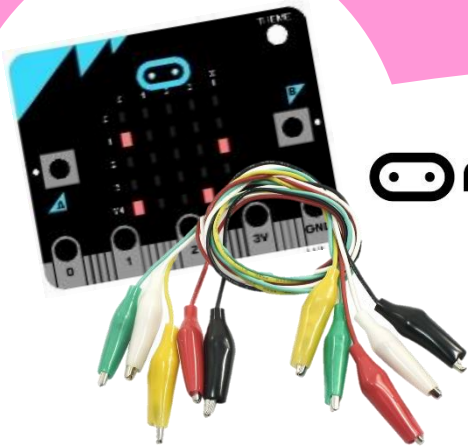


CODING

STEM
WORKS
THINKit



 micro:bit

Marine Munch Activity

Grades

K-12

Career Pathways

Computer Scientist
Programmer
Biologist

Academics

Math: Logic, Computational Thinking
Science: Food Web
Computer Science: Block Coding

Professional Career Skills

Collaboration
Problem Solving
Perseverance

Materials

Computer
Micro:bit Kit
3-4 Alligator Clips (Makey Makey Kit)
Conductive Tape
Craft Supplies: Scissors, Tape, Glue,
Markers, Cardstock

Team Goal

Level 1

Code Micro:bit buttons to share information on a model.

Level 2

Code Micro:bit to interact with a circuit using “pins” to share information on a model.

Level 3

Code Micro:bit to interact with circuits and buttons to share information on a model.

STEM
WORKS

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Think like a computer scientist with Micro:bit



Algorithm

As you drag and drop block code or writing in Javascript, you are creating a list of specific steps. Your algorithm can be interfaced with through the LEDs, buttons and pins on Micro:bit.



Cloud Computing

Micro:bit's Javascript coding software is internet-based, so information from the cloud is needed to write the program. But since you download the code, the internet is not needed to run a program.



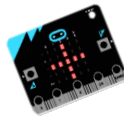
Computer Program

You write multiple sets of algorithms, or directions, which can be stored and run on your Micro:bit.



Computational Thinking

There are many different ways to solve a problem with Micro:bit; you need to recognize patterns, think abstractly, and write algorithms.



Debugging

When you test your code with your Micro:bit, you might find a bug that needs to be checked and corrected before the code works!



Database

The Javascript Blocks online software has an organized database of blocks and Javascript code that can be run on the Micro:bit. The code is organized into categories like input, logic, loops, music, etc.



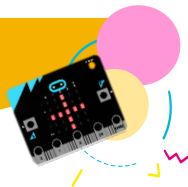
Binary

A computer's brain reads only two options, like 1 or 0. All algorithms, or lists of steps, are made up of these two options. Code is translated into this binary "machine language."



Machine Language

Inside Micro:bit is a tiny processor. The code you write with Javascript is translated into a machine language, written in numbers, that the Micro:bit can understand.



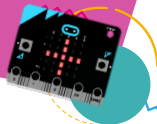
Artificial Intelligence

Micro:bit can't hear your speech or recognize images. It can only sense when a complete circuit is made using buttons or pins.



Programming Language

Your Micro:bit can interpret Javascript Blocks, which is a graphical programming language. It can also process code written in Javascript.



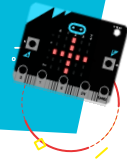
Natural Language Processing

Micro:bit's processor does not have the ability to understand (process, respond or manipulate) your words.



Parallel and Distributed Computing

Micro:bit would be more powerful if it could share processing with other Micro:bits. But they cannot share messages or solve problems together.

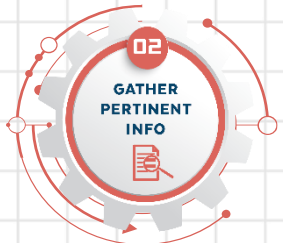


Engineering Design Process Directions:



Define the Problem

Choose a goal to tackle with your team!



Gather Pertinent Information

Connect Micro:bit to computer with the USB cable.

Open the Javascript Blocks editor:  <https://makecode.microbit.org>



Generate Multiple Solutions

Decide on the information you want to share.

Choose Coding Blocks to design new algorithms that help to share that information. Try algorithms as you design them using the screen simulator.

(See [Micro:bit Programming Tips](#) sheet)



Choose a Solution

Connect Micro:bit to the computer.

Choose the algorithms to download onto the Micro:bit.

Click  **Download** and save the program file to your “MICROBIT” drive.



Design a Culturally Responsive Solution

Design your model to work with algorithms so you share accurate

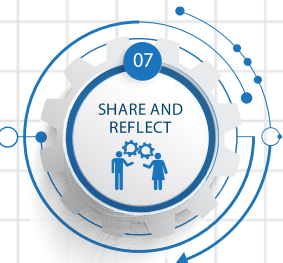
information. How has your team been sharing responsibilities and resources?



Test and Optimize

Disconnect the Micro:bit from the computer and connect to the battery.

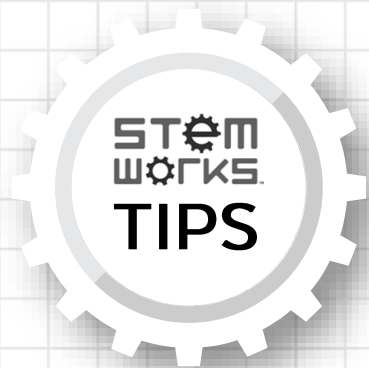
Run your program. Does it accurately share information and work with your model? Use what you learned to improve your interactive solution.



Share & Reflect

How did your team find solutions and practice perseverance?

Talk to your team: What went well? What could have gone better?



micro:bit Programming Tips

<https://makecode.microbit.org>

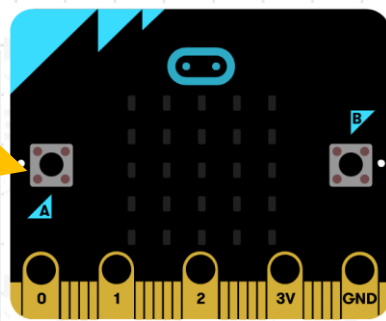
Find each Javascript Block in the color coded menu to write algorithms. You will build multiple algorithms for your program. Your algorithms will become a program that works with your model. Your goal is to use the Micro:bit buttons (A or B), and the Pins (0, 1, or 2) to identify names of animals in your food web model.

Diagram

- Basic
- Input
- Music
- Led
- Radio
- Loops
- Logic
- Variables
- Math

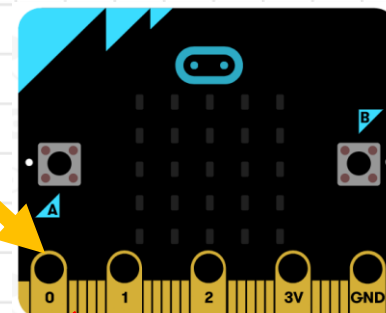
Using Buttons A or B

```
forever loop
  if button A is pressed
  then
  repeat 4 times
  do
  show string "Wana"
```



Using Pins 0, 1, or 2

```
forever loop
  if pin P0 is pressed
  then
  repeat 4 times
  do
  show string "Ma'o"
```



Micro:bit & Circuits

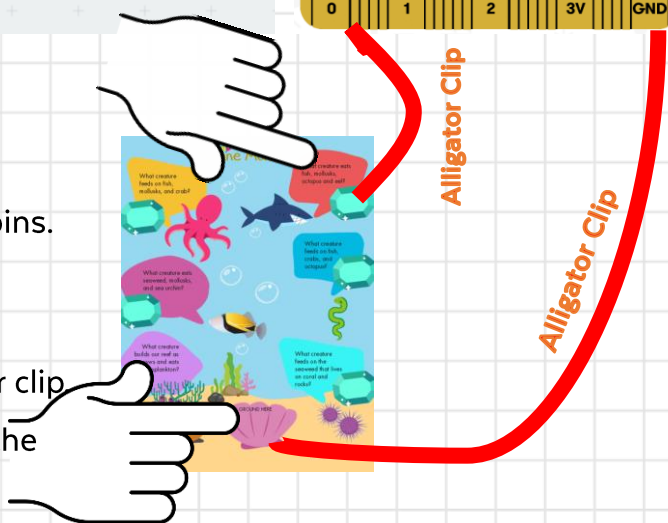
Code algorithms with the need to use buttons or pins.

Attach conductive tape on three of your question boxes and on the "Ground Here" box.

Connect "GND" to "Ground Here" with an alligator clip

Connect each "Pin" (0, 1, or 2) on the Micro:bit to the foil by each question with an alligator clip.

Touch "Ground Here" and the question. If your algorithms are debugged and you have a good circuit, the Micro:bit will read the correct animal name!



Marine Munch

What creature feeds on fish, mollusks, and crab?

What creature eats fish, mollusks, octopus and eel?

What creature feeds on fish, crabs, and octopus?

What creature eats seaweed, mollusks, and sea urchin?

What creature feeds on the seaweed that lives on coral and rocks?

What creature builds our reef as it grows and eats zooplankton?

GROUND HERE

Marine Munch

KEY

Draw lines to match your code with the sea animal

Button A

Shark



Button B

Octopus



Pin 0

Triggerfish



Pin 1

Sea Urchin



Pin 2

Coral



Button A+B

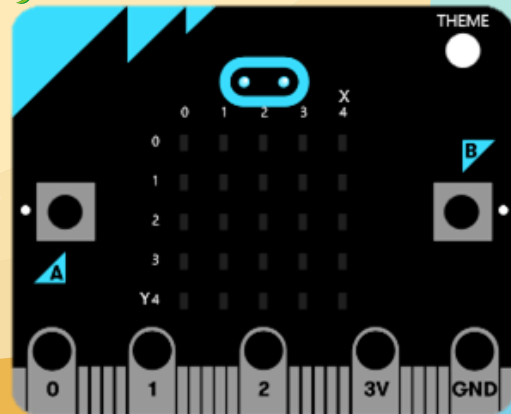
Eel



Button A

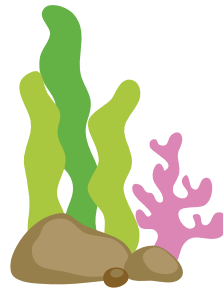
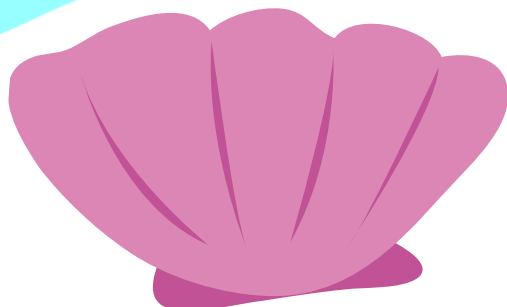
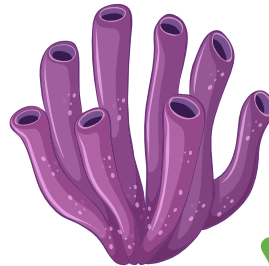
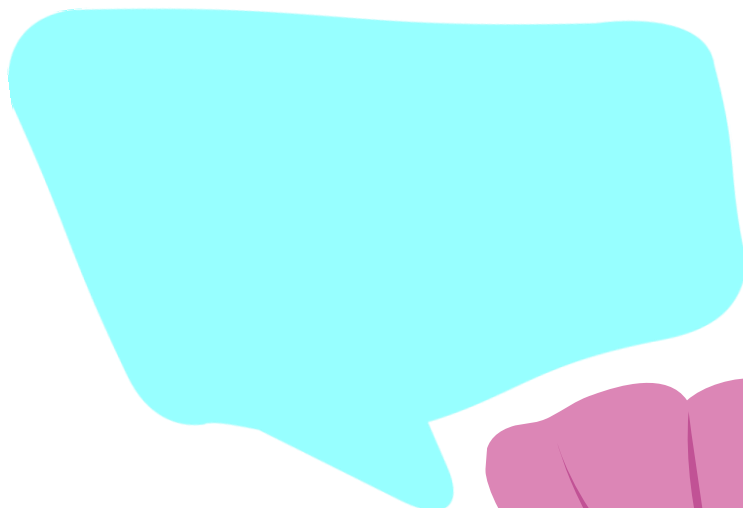
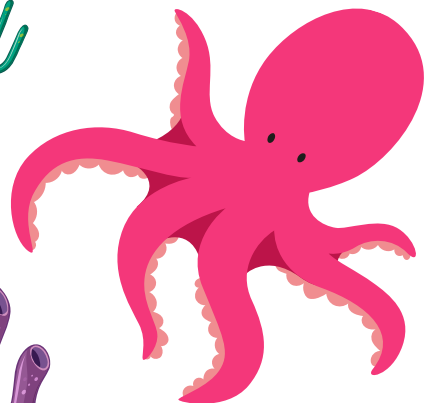
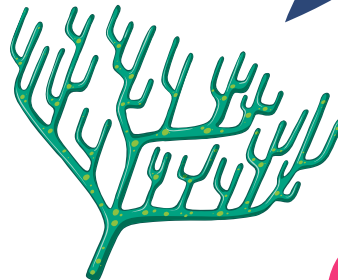
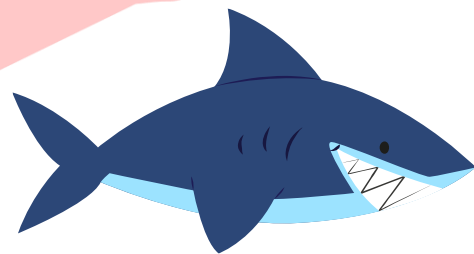
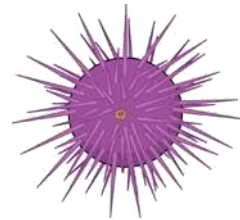


Button B



Pin 0 Pin 1 Pin 2

Marine Munch



Key

Button A

Button B

Pin 0

Pin 1

Pin 2

Button A+B

