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

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.

Materials
Computer
Micro:bit Kit
3–4 Alligator Clips (Makey Makey Kit)
Conductive Tape
Craft Supplies: Scissors, Tape, Glue, Markers, Cardstock
<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Cloud Computing</th>
<th>Computer Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>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.</td>
<td>You write multiple sets of algorithms, or directions, which can be stored and run on your Micro:bit.</td>
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<tr>
<th>Computational Thinking</th>
<th>Debugging</th>
<th>Database</th>
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<tr>
<td>There are many different ways to solve a problem with Micro:bit; you need to recognize patterns, think abstractly, and write algorithms.</td>
<td>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!</td>
<td>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.</td>
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<th>Binary</th>
<th>Machine Language</th>
<th>Artificial Intelligence</th>
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<tr>
<td>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.”</td>
<td>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.</td>
<td>Micro:bit can’t hear your speech or recognize images. It can only sense when a complete circuit is made using buttons or pins.</td>
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<th>Programming Language</th>
<th>Natural Language Processing</th>
<th>Parallel and Distributed Computing</th>
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<tr>
<td>Your Micro:bit can interpret Javascript Blocks, which is a graphical programming language. It can also process code written in Javascript.</td>
<td>Micro:bit’s processor does not have the ability to understand (process, respond or manipulate) your words.</td>
<td>Micro:bit would be more powerful if it could share processing with other Micro:bits. But they cannot share messages or solve problems together.</td>
</tr>
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</table>

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](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?
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

**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 eats seaweed, mollusks, and sea urchin?

What creature feeds on fish, crabs, and octopus?

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

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

GROUND HERE
KEY

Draw lines to match your code with the sea animal

<table>
<thead>
<tr>
<th>Button A</th>
<th>Shark</th>
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<tbody>
<tr>
<td>Button B</td>
<td>Octopus</td>
</tr>
<tr>
<td>Pin 0</td>
<td>Triggerfish</td>
</tr>
<tr>
<td>Pin 1</td>
<td>Sea Urchin</td>
</tr>
<tr>
<td>Pin 2</td>
<td>Coral</td>
</tr>
<tr>
<td>Button A+B</td>
<td>Eel</td>
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</tbody>
</table>

Pin 0 Pin 1 Pin 2

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Key

Button A

Button B

Pin 0

Pin 1

Pin 2

Button A+B