

# Hello World

Using technology to connect  
students  
with outdoor growing spaces

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# Getting to know you...

- Does your program have **access to a school garden?**
- What **challenges or benefits** do you feel come with students learning in the garden?



# Decision-making in the garden

- Do **students play a role in making decisions** related to the garden?

Which crops should we plant and where?  
When and how much should we water?

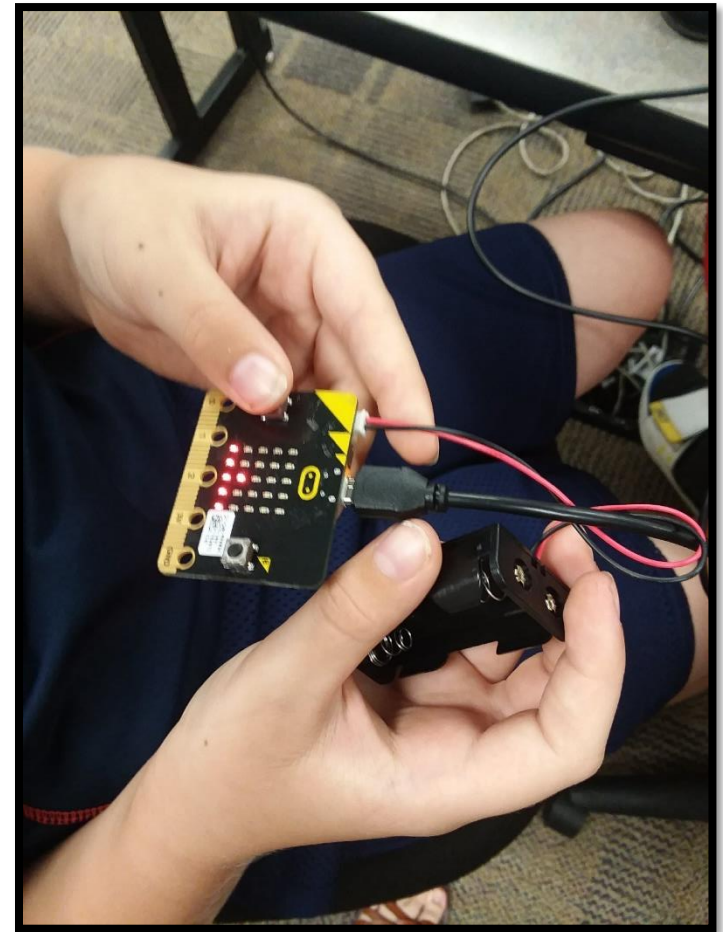
- What **challenges or benefits** come with students as decision makers?
- What **knowledge, skills, tools** or would be helpful in supporting student-driven decision-making?

# Increasing Science Literacy

An enhanced capacity,  
both at the individual and collective levels,  
to **make effective decisions**  
**grounded in STEM-informed analyses**  
**of complex, real-world challenges.**

# Why introduce technology in the garden?

- Transferable STEM knowledge and skills
- Relevant to students' lives and interests
- Generate and analyze data to make decisions
- Exposure to career connections

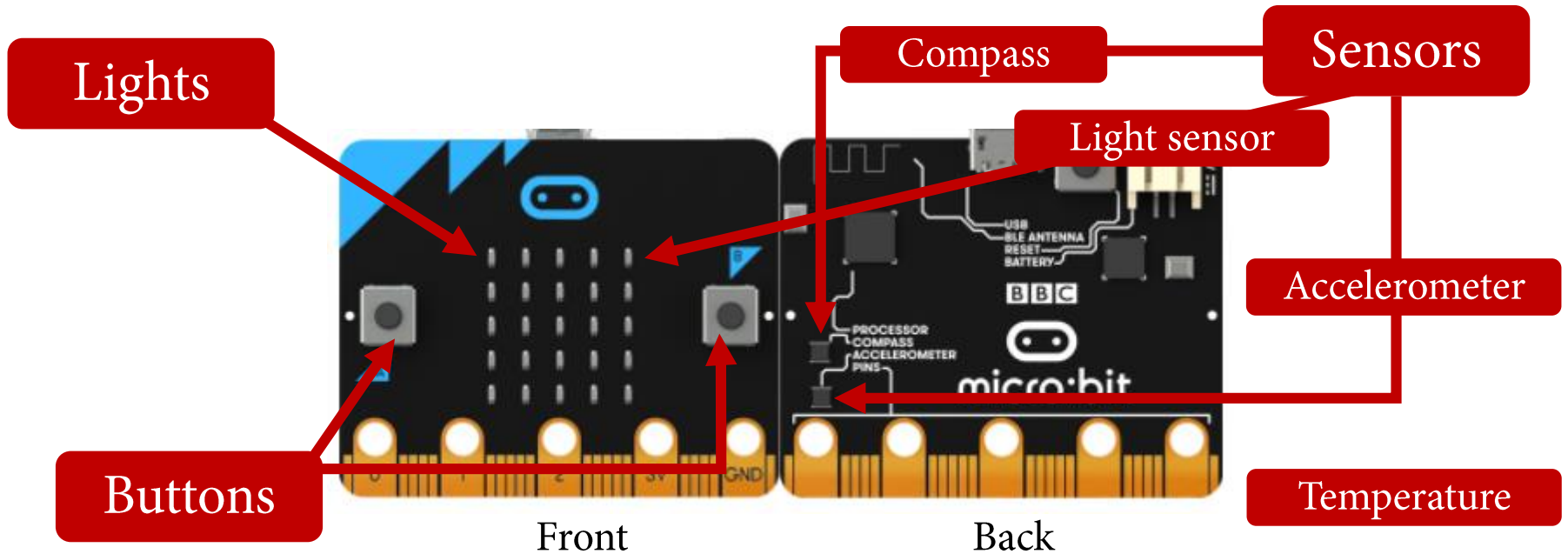


# Our goals for today

- Introduce the micro:bit and its features
- Learn how to connect and program the micro:bit
- Practice drag-and-drop coding skills
- Apply coding skills to measure soil moisture

# What is a micro:bit?

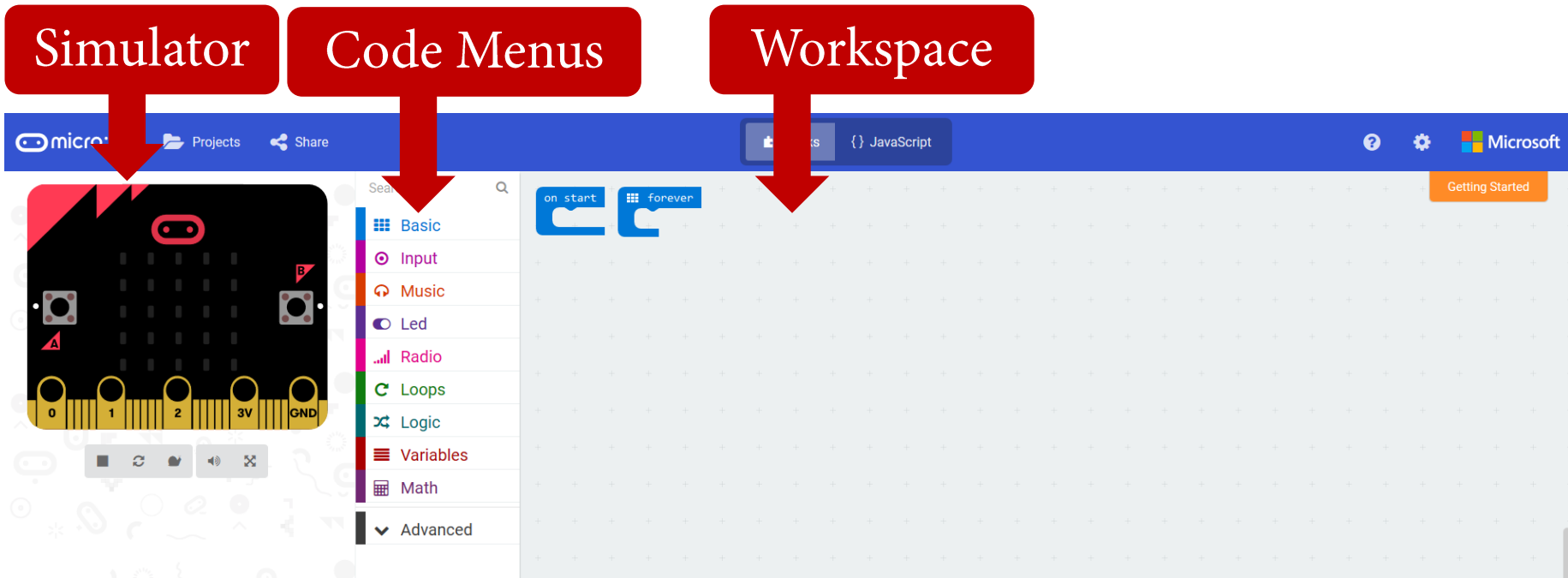
- A personal programmable device



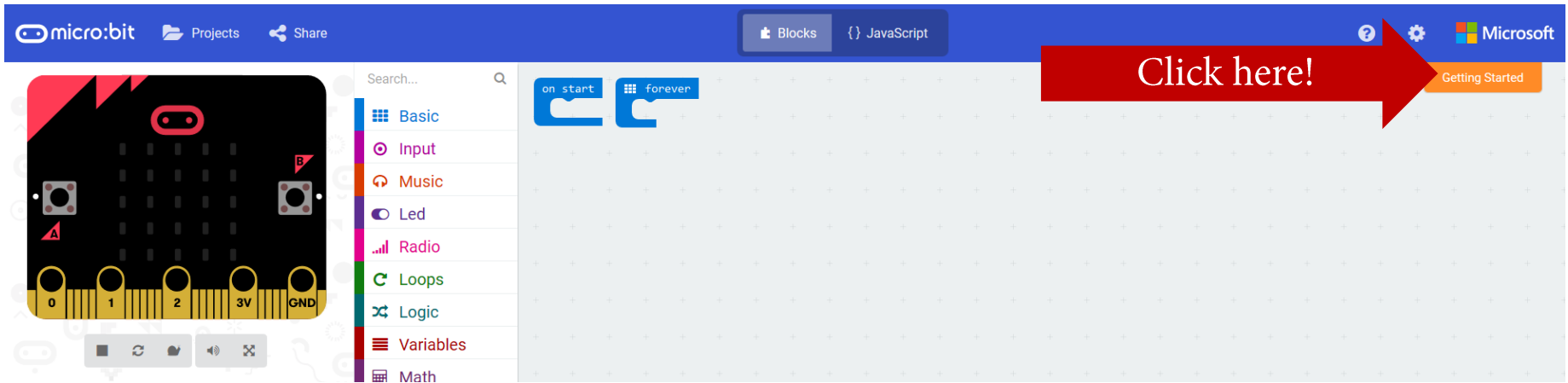
<http://microbit.org/guide/features/>

# Programming your micro:bit

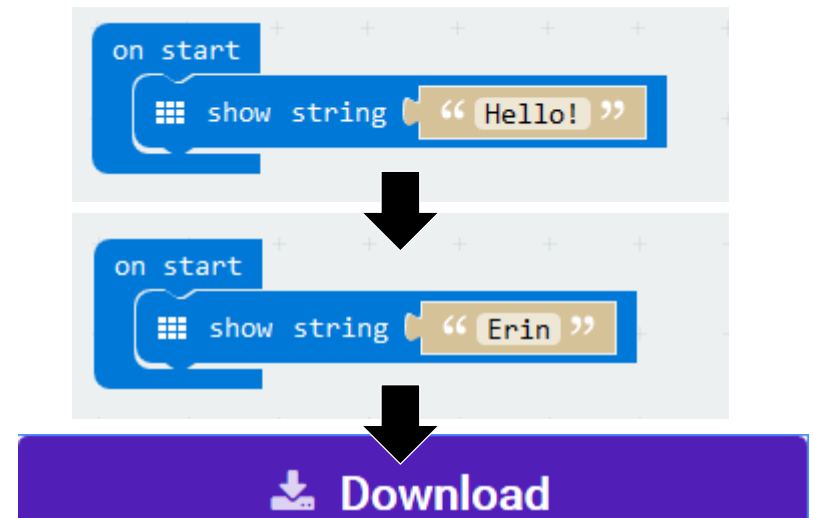
- Open a web browser (I recommend Firefox)
- Navigate to the code block editor, <https://makecode.microbit.org/>



# Hello World!



- Follow tutorial directions
- Use drag-and-drop code blocks to create a program to show your name
- Download the program



# Connecting your micro:bit

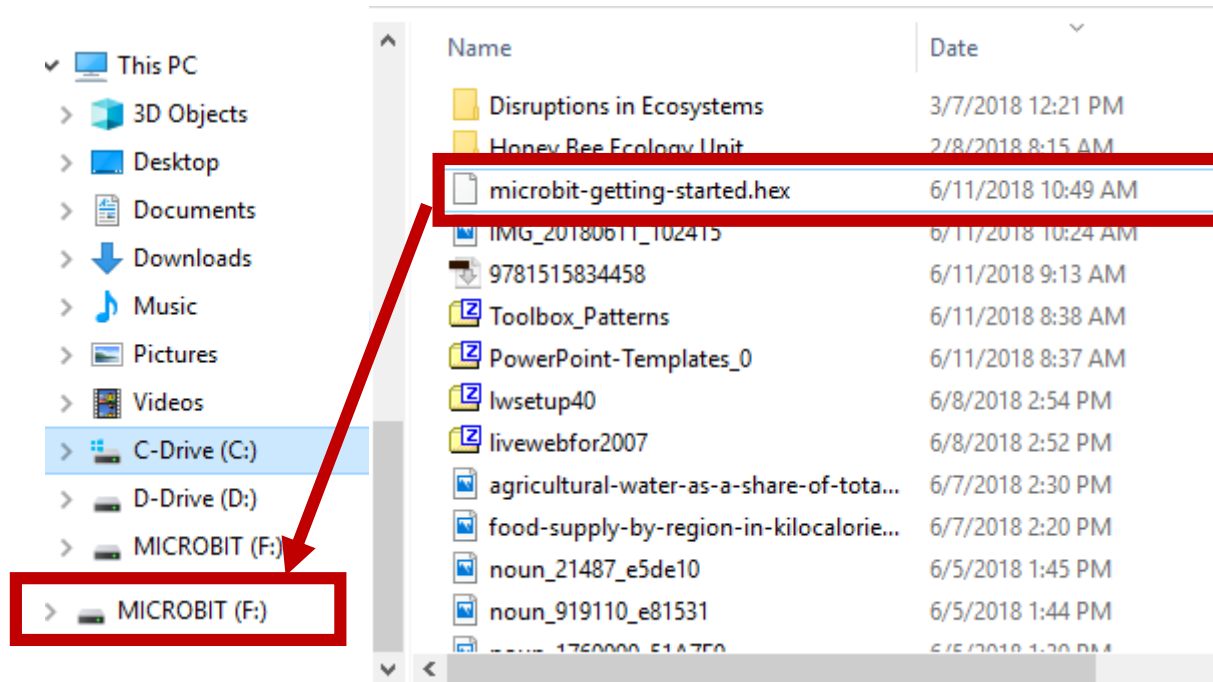
- Using the USB cord, connect the board to your computer.



Front

# Uploading a program

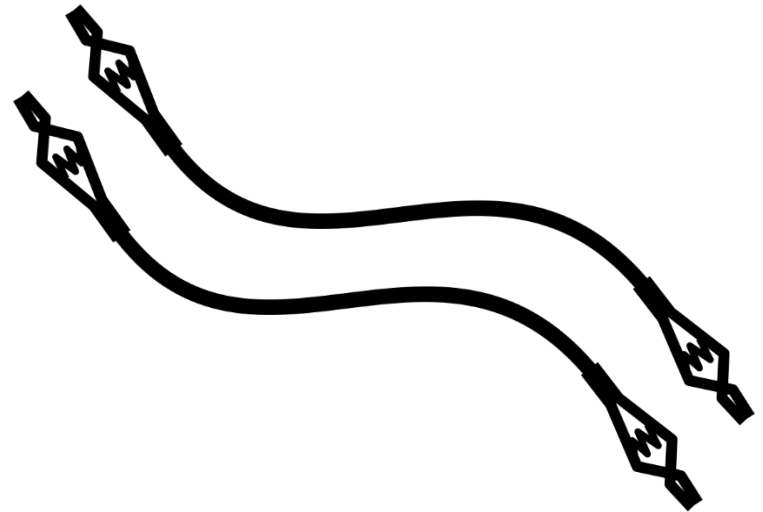
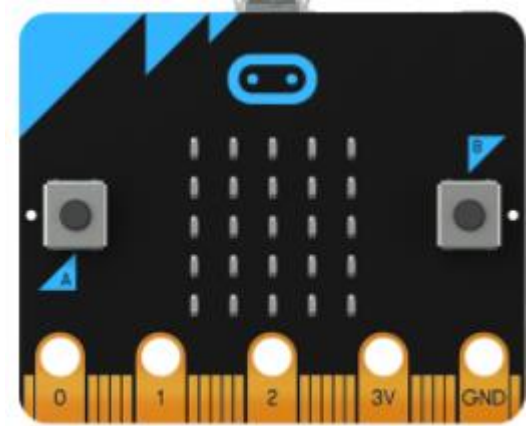
- Open Windows Explorer
- Find the MICROBIT device, drag program to device



# Making a soil moisture sensor

## Materials

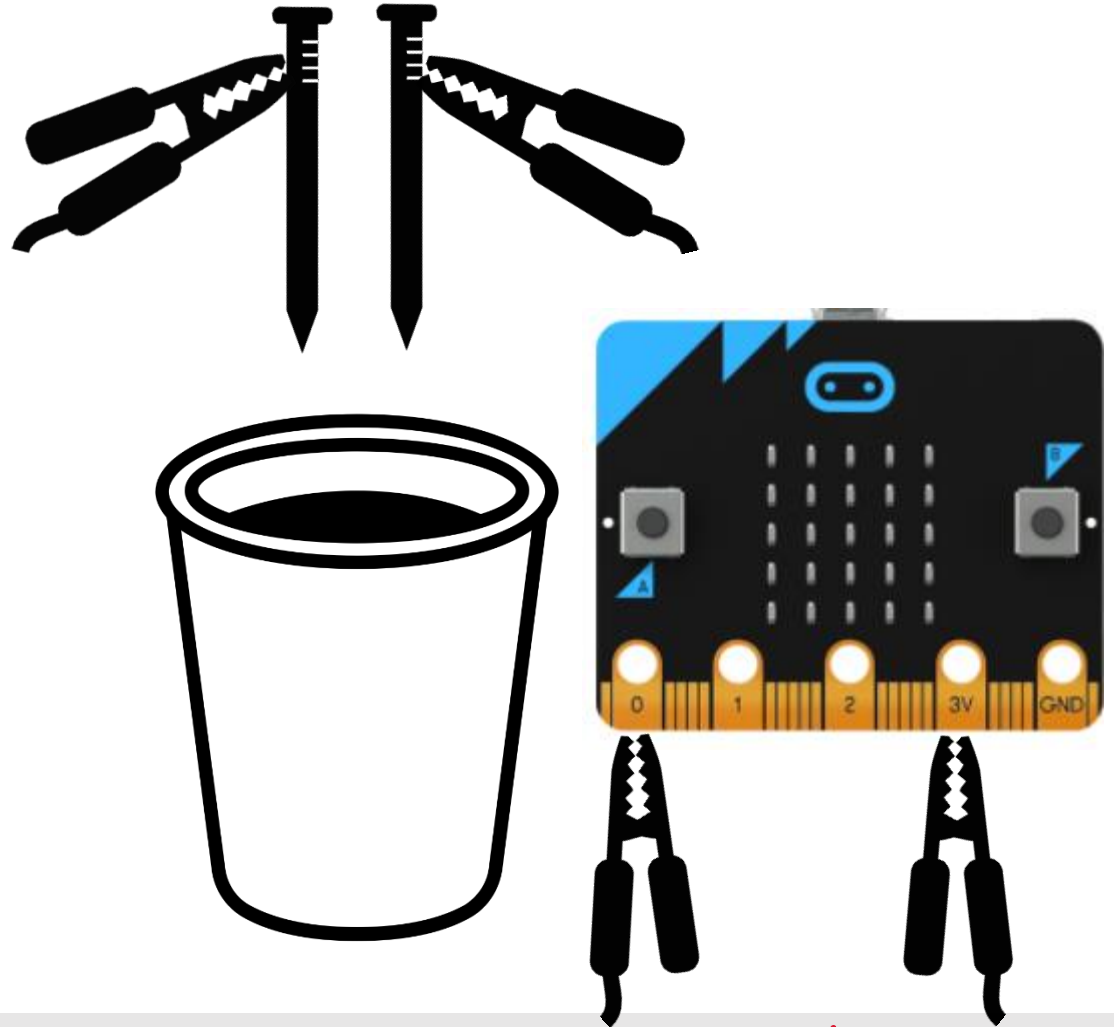
- 1 micro:bit
- 2 nails
- 2 alligator clips



# Making a soil moisture sensor

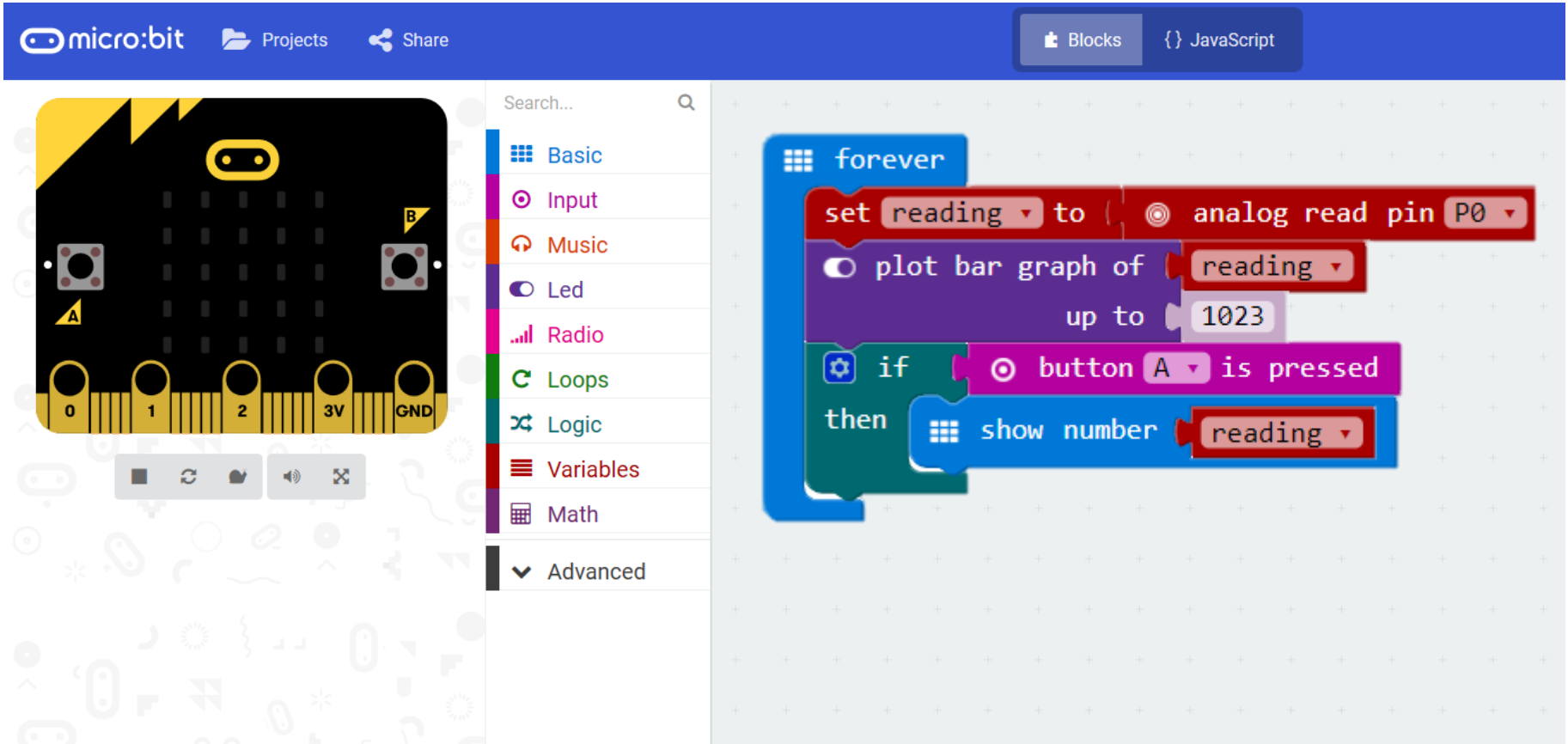
## Steps

- Connect a nail to the 3V pin with a croc clip
- Connect the other nail to the P0 pin with a croc clip
- Insert nails into soil



# Coding the soil moisture sensor

- Navigate to <https://makecode.microbit.org/>



The screenshot displays the Micro:bit MakeCode editor interface. On the left, a virtual Micro:bit board is shown with pins labeled 0, 1, 2, 3V, and GND. A central menu lists various coding categories: Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced. The main workspace contains a JavaScript code block with the following logic:

```
forever loop
  set reading to (analog read pin P0)
  plot bar graph of reading up to 1023
  if (button A is pressed) then
    show number reading
```

# Testing your sensor



# Discussion

- How might students explore the garden using sensors?
- What data can we gather using sensors?
- How can this data support better decision making in the garden?

# Summer Pilot

- Miranda Earnest
  - Senior Agronomy and Horticulture major
  - Science Literacy Initiative summer intern
  - Piloted materials at CLC sites in Central Nebraska over the summer
- Tips and Tricks
- Challenges

# Student feedback

- I love it! **It made me feel really smart** when I coded the microbit. I loved when we tested the code! It was interesting.
- I like checking the soil and when **we went to the gardens** and put them in the soil and **got different results**
- It was fascinating how **we programmed the microchips to tell us how much moisture** was in the plants.



Questions?

# Measuring light

The image shows the micro:bit online editor interface. At the top, there is a blue header with the 'micro:bit' logo, 'Projects', and 'Share' buttons. On the right side of the header, there are tabs for 'Blocks' and 'JavaScript'. Below the header, on the left, is a virtual image of the micro:bit board with pins labeled 0, 1, 2, 3V, and GND. A search bar is located above a category list on the left side of the workspace. The category list includes: Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced. The main workspace on the right contains a 'forever' loop block with a 'plot bar graph of light level' block inside. The 'plot bar graph of' block has a 'light level' sensor icon and a value of '255' set in the 'up to' field.

# Measuring temperature

The image shows the micro:bit IDE interface. On the left is a virtual image of the micro:bit board. The top navigation bar includes 'micro:bit', 'Projects', 'Share', 'Blocks', and 'JavaScript'. A central menu lists categories: Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced. The main workspace displays two code snippets:

**Snippet 1 (Celsius):**

```
forever loop
  set temp to temperature (°C)
  show number temp
```

**Snippet 2 (Fahrenheit):**

```
forever loop
  set c to temperature (°C)
  set f to (c * 1.8) + 32
  show number f
```

The word "OR" is centered between the two snippets.

# Looking for more ways to use your micro:bit?

- Projects: <http://microbit.org/ideas/>
- Lessons: A 14-week introduction to computer science course, <https://makecode.microbit.org/courses/csintro>