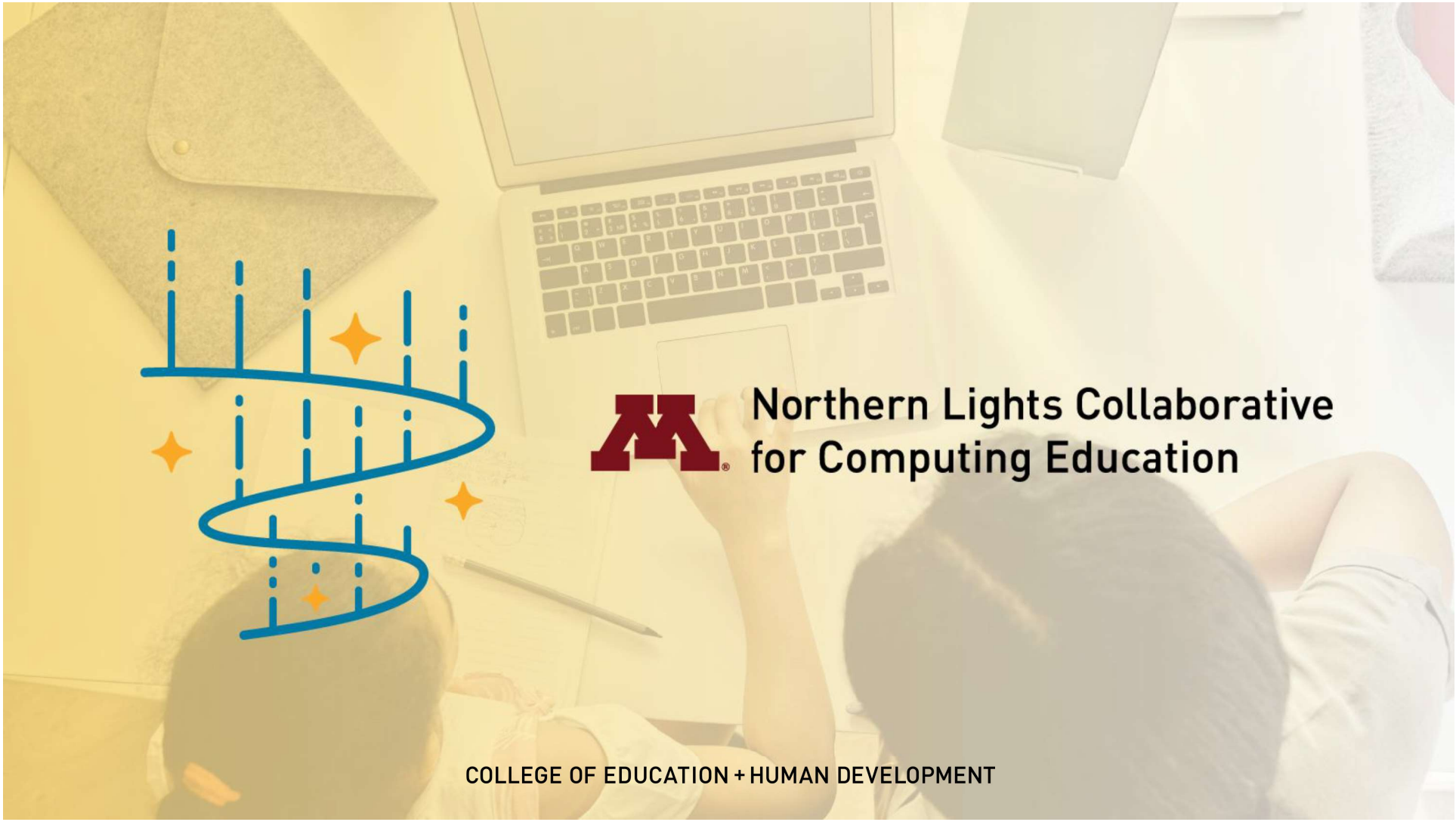
Northern Lights Collaborative
for Computing Education
COLLEGE OF EDUCATION + HUMAN DEVELOPMENT

Data Collection and Visualization with micro:bit

2026 Minndependent STEM Education Conference
Wednesday, August 12th, 2026

Slides: z.umn.edu/microbitstem26

COLLEGE OF EDUCATION + HUMAN DEVELOPMENT

Slides: z.umn.edu/mnstem26

About Northern Lights Collaborative

Our mission

We develop evidence-based programs and resources in collaboration with educators and partners that support inclusive K-16 computing education.

Our values

- Inclusive
- Community-oriented
- Evidence-based
- Impactful

Our vision

We aim to serve as a guiding light and a source of inspiration in creating a just and equitable society where computing education is universally accessible, inclusive, and responsive to the unique needs and aspirations of all learners and educators.

Northern Lights Collaborative for Computing Education

Northern Lights Team

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District Support Coordinator, NLC
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Slides: z.umn.edu/microbitstem26

Northern Lights Collaborative
for Computing Education

Session Agenda

Time	Topic
15 min	Introduce micro:bit and connect to computer
20 min	Explore data logging and visualization features
15 min	Brainstorm activities, extensions, connections

Slides: z.umn.edu/microbitstem26

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Session Goals

- Introduce micro:bit
- Practice data logging and visualization
- Brainstorm possible activities, connect to MN Standards
- Briefly connect to Create AI curriculum

Slides: z.umn.edu/microbitstem26

What is the micro:bit?

Slides:
z.umn.edu/microbitstem26

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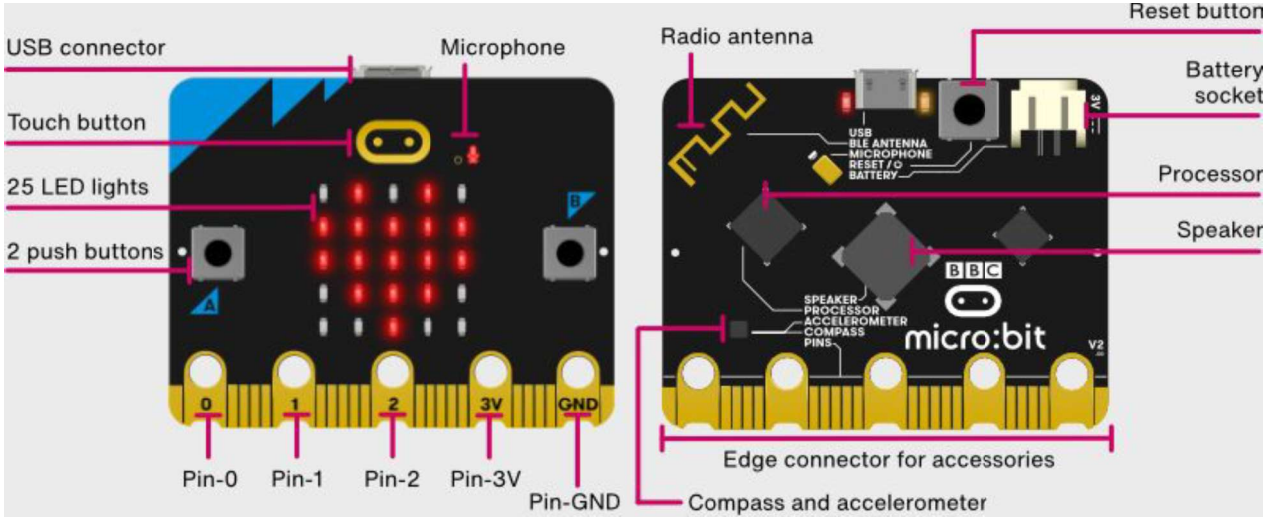
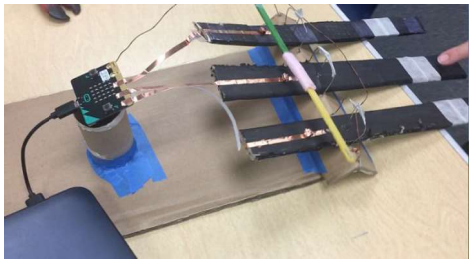
What is a micro:bit?

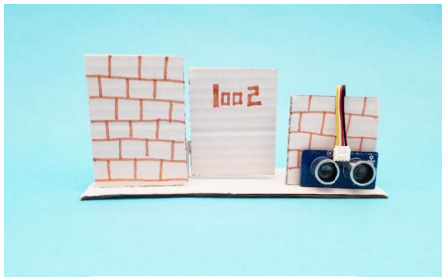


- ***A 'microcomputer' with several built-in features including:***
  - *Assortment of sensors*
  - *Buttons*
  - *LED matrix*
  - *Speaker, microphone, etc*

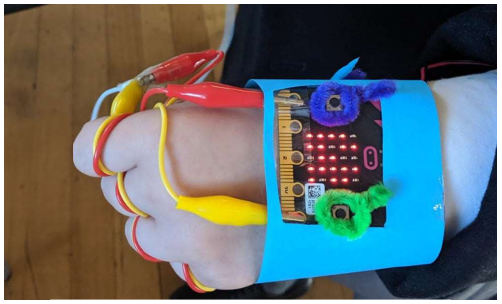
What can a micro:bit do?



From MakeCode



From Seeedstudio



from Modern Teaching Blog

From CSER STEM

- Collection of micro:bit project ideas
- micro:bit tutorial projects
- Create AI projects to introduce machine learning/AI
- you can click on any of the images on this slide to see more examples

...a lot

Pros/cons

- Inexpensive (~$20/unit), durable
- Low floor, high ceiling, wide walls
- Has built-in features to allow for immediate plug and play programming
- Can program with blocks, JavaScript, or Python
- Widely supported, huge amount of free resources from micro:bit and community

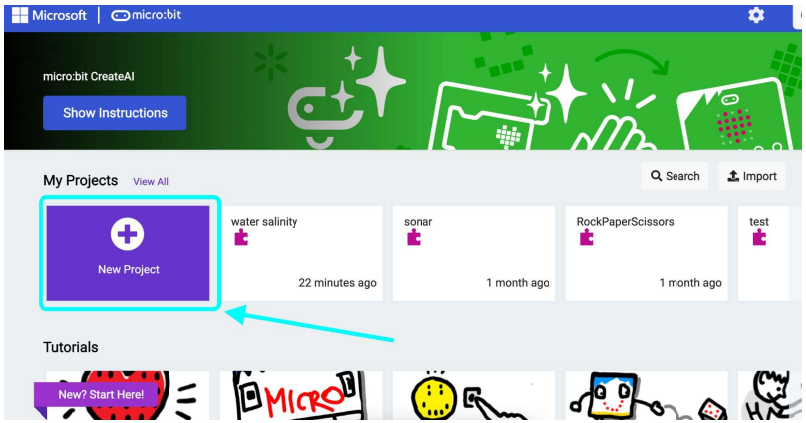
- Material management
- Can have connectivity challenges
- Cost involved

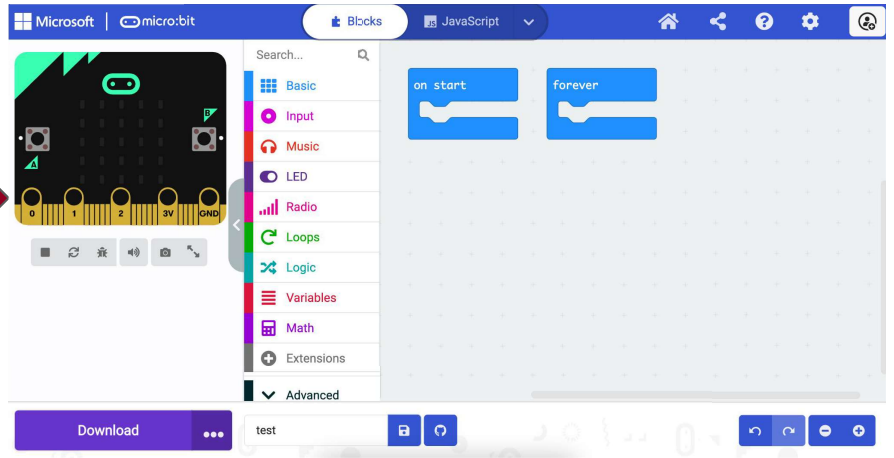
micro:bit alternatives

- Raspberry Pi devices
- Arduino devices
- AdaFruit Circuit Playground

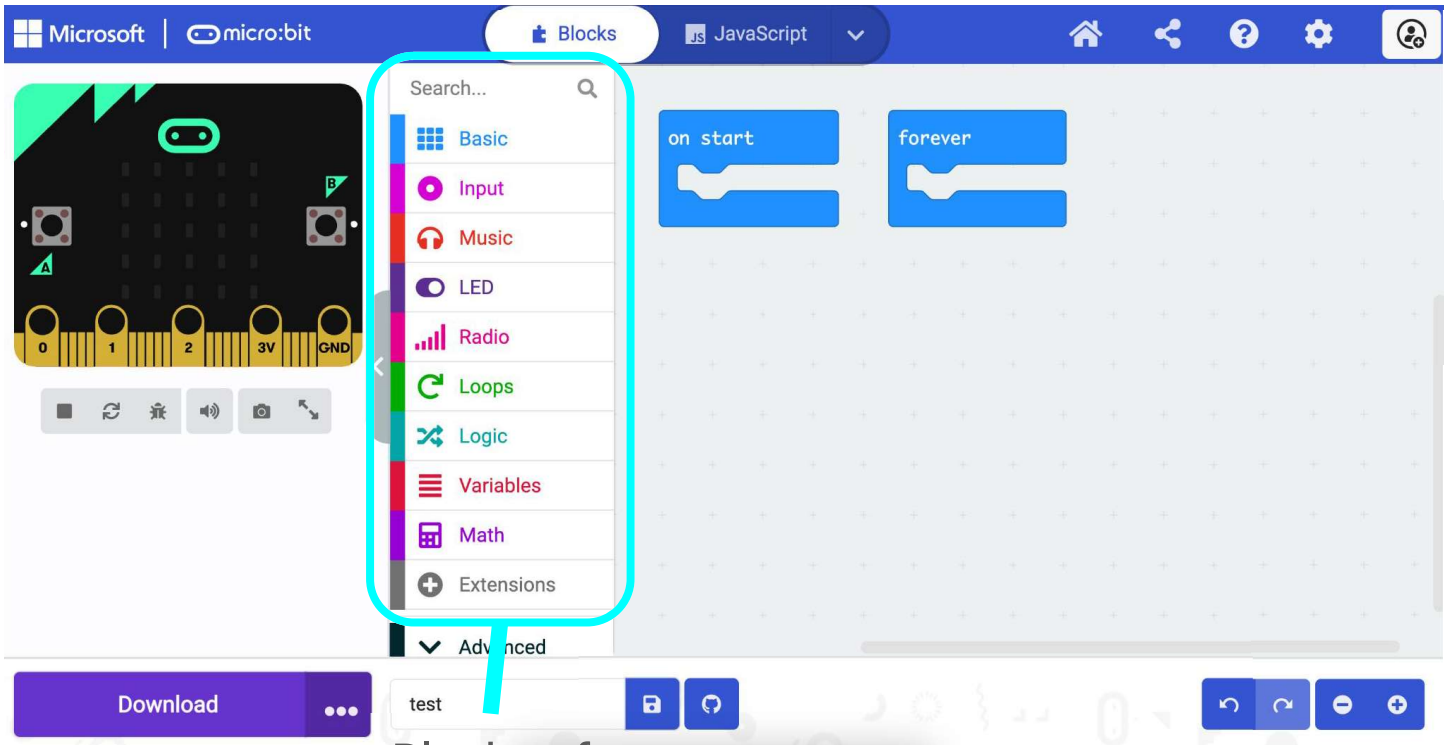
How do I program the micro:bit?

1. Go to: https://makecode.microbit.org
2. Click on “New Project”





Virtual Simulator



Work area

Blocks of code

Connect your micro:bit

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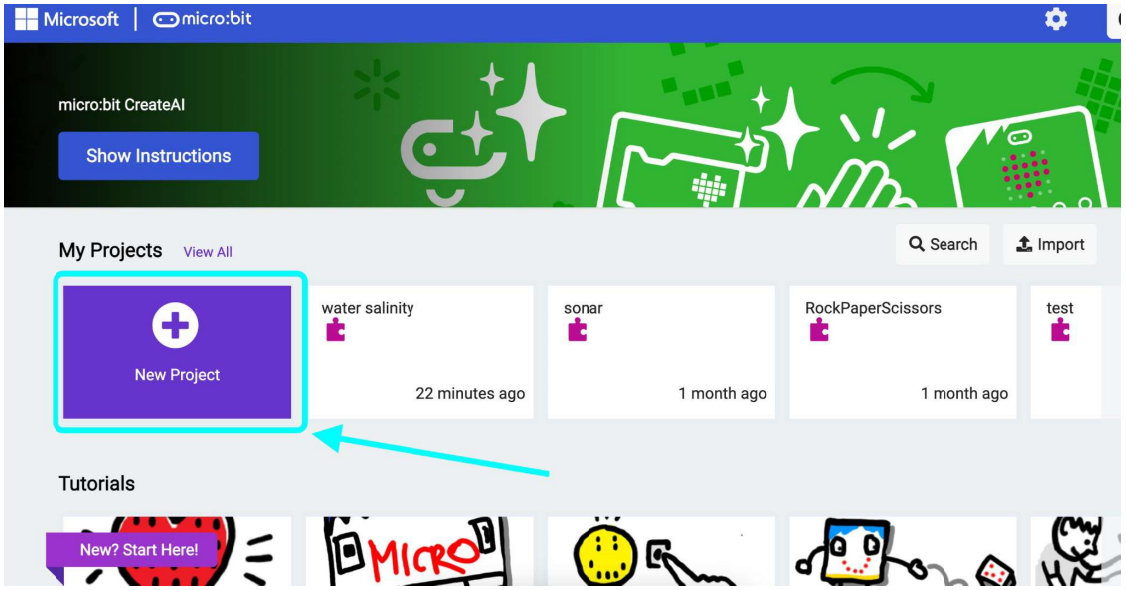
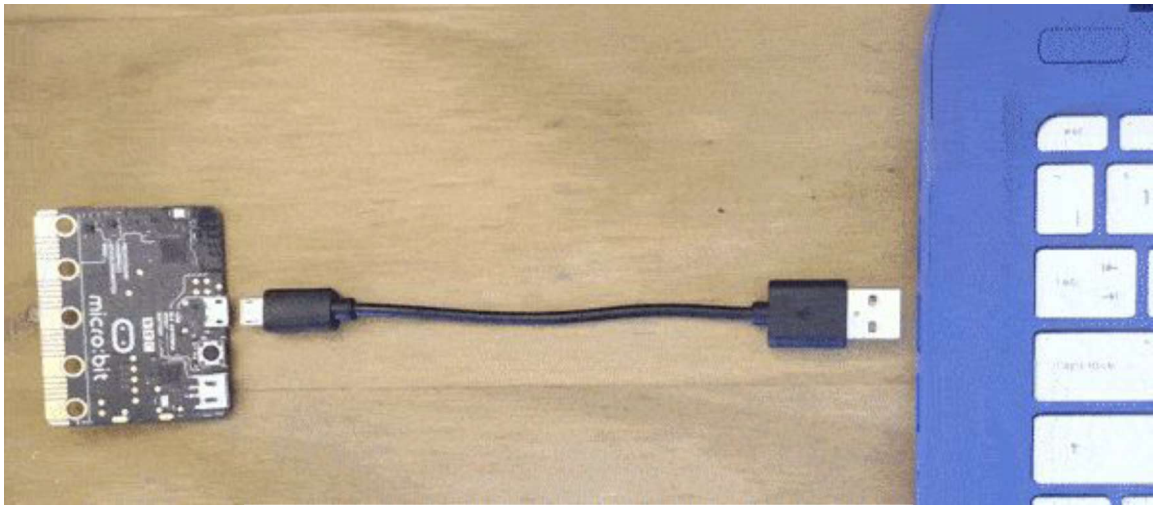
Step 1

- Go to https://makecode.microbit.org
  - Open a new project or tutorial project



Step 2

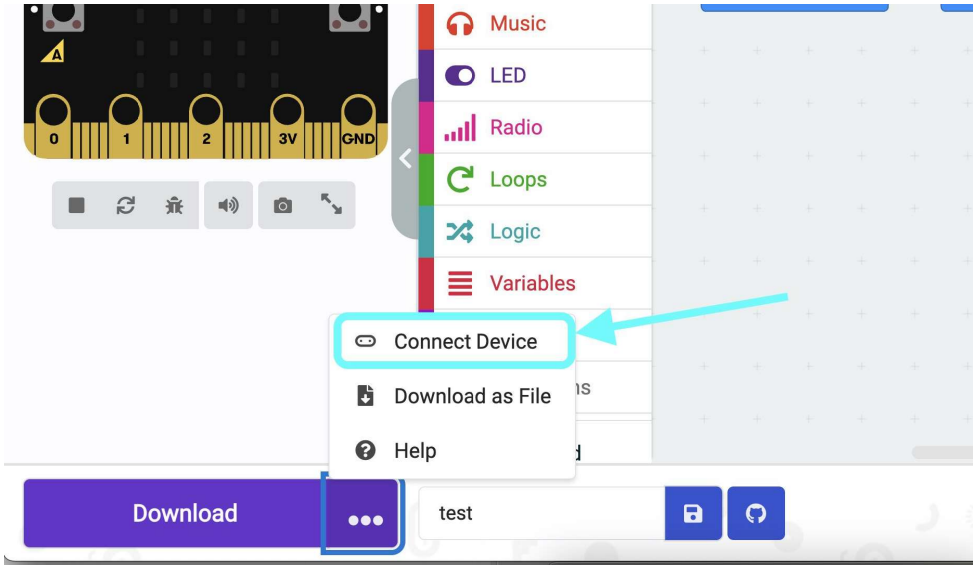
- Plug in your micro:bit to your computer using the provided cable
  - USB → USB-C adapters available if needed



[.gif from micro:bit support]

Step 3

- Click the “...” menu → then click “Connect Device” option
  - Follow the on screen instructions



Troubleshooting connection challenges

- Try to refresh your web page
- Unplug your micro:bit and plug it back in
- Try a different web browser
- Restart the computer
- Cross your fingers

Data Logging and Visualization

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Data recording, visualization, and analysis

- The V2 micro:bit can record data utilizing a variety of onboard sensors, or sensors you connect to the micro:bit
- Data can then be returned to the computer, and displayed in various forms

Our activity:

- Practice collecting and analyzing data around light levels and temperature
- Activity adapted from YouTube channel “Advanced Learning Partnerships”
  - Link to full video
- We will use the built in:
  - Temperature sensor (link to sensor details)
  - Light sensor (link to sensor details)

- Further resources for micro:bit data logging

Steps for Data Logging

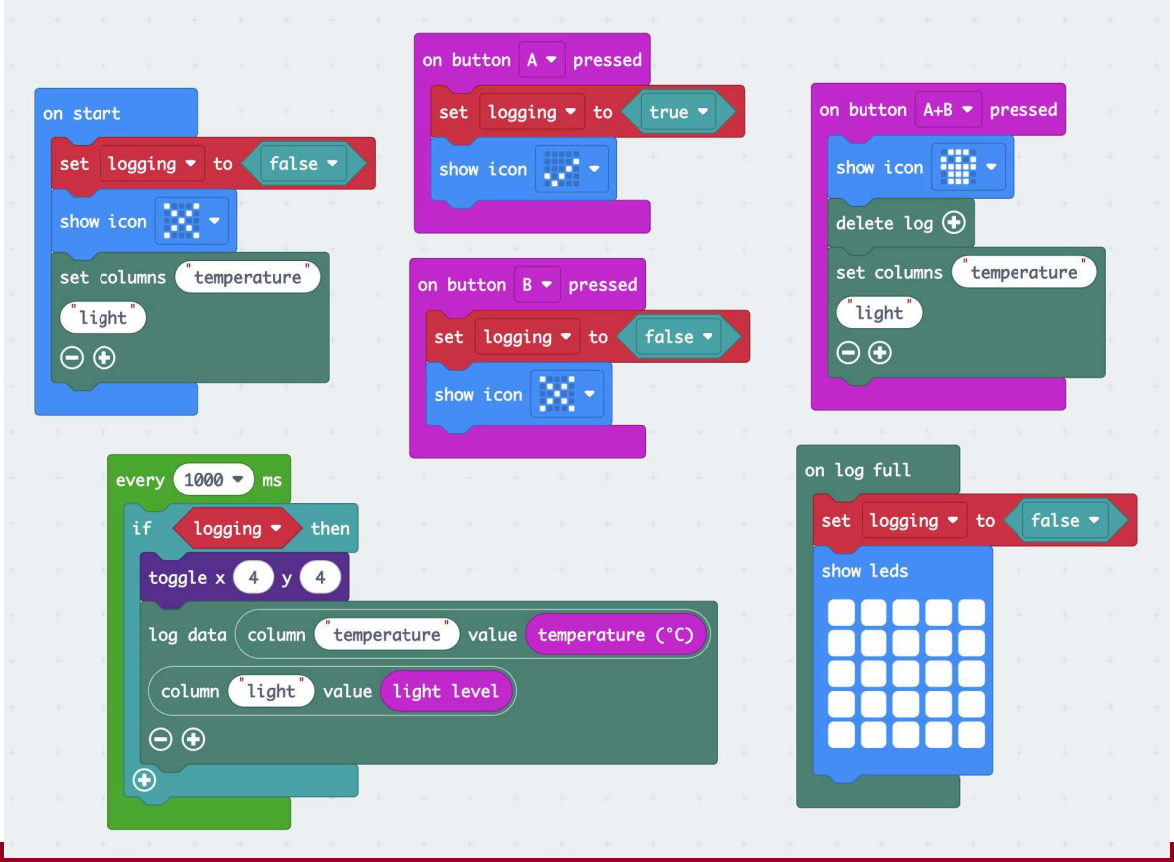
- Create your program in MakeCode
- Send your program to you micro:bit
- Detach micro:bit from computer, and connect battery pack
- Collect data in fun ways
- When done collecting data, plug micro:bit back in
- Open the micro:bit as a folder (File Manager, Explorer, etc)
- Get data off of micro:bit (Filename = “MY_DATA”)
- Explore and analyze data

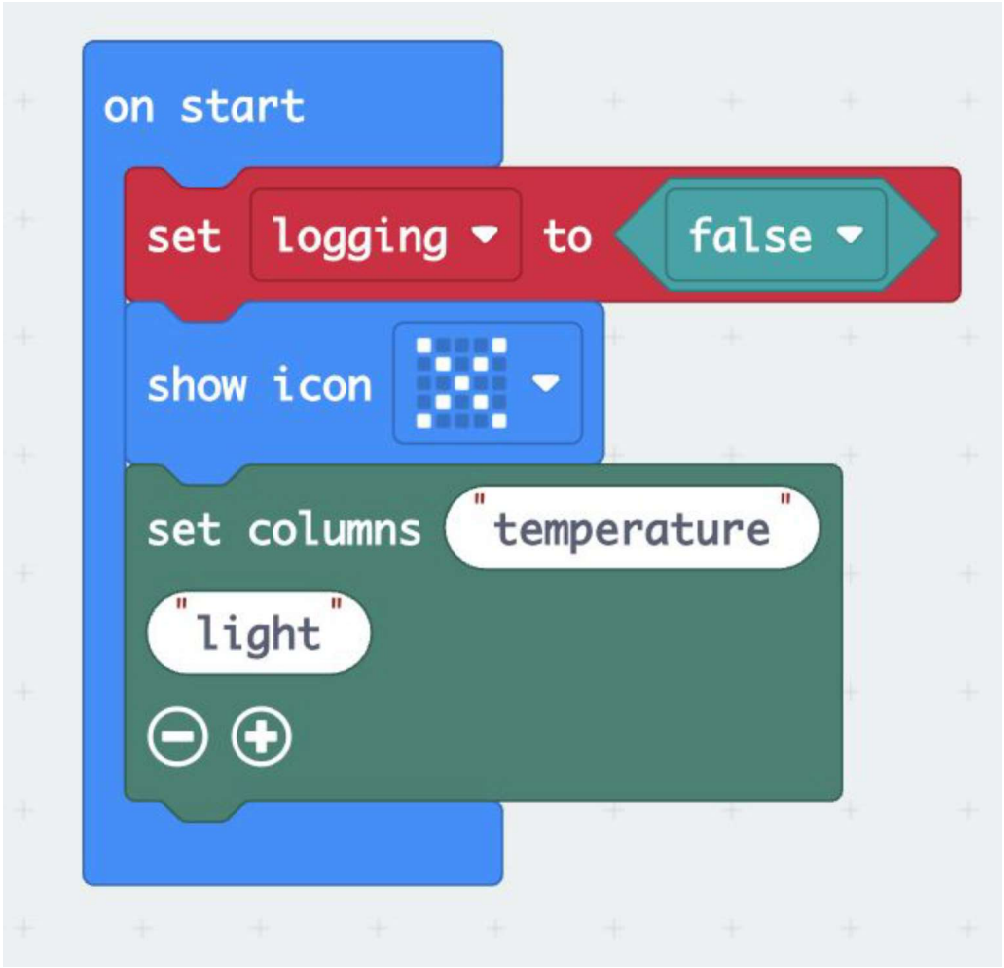
Let's take a look at our program

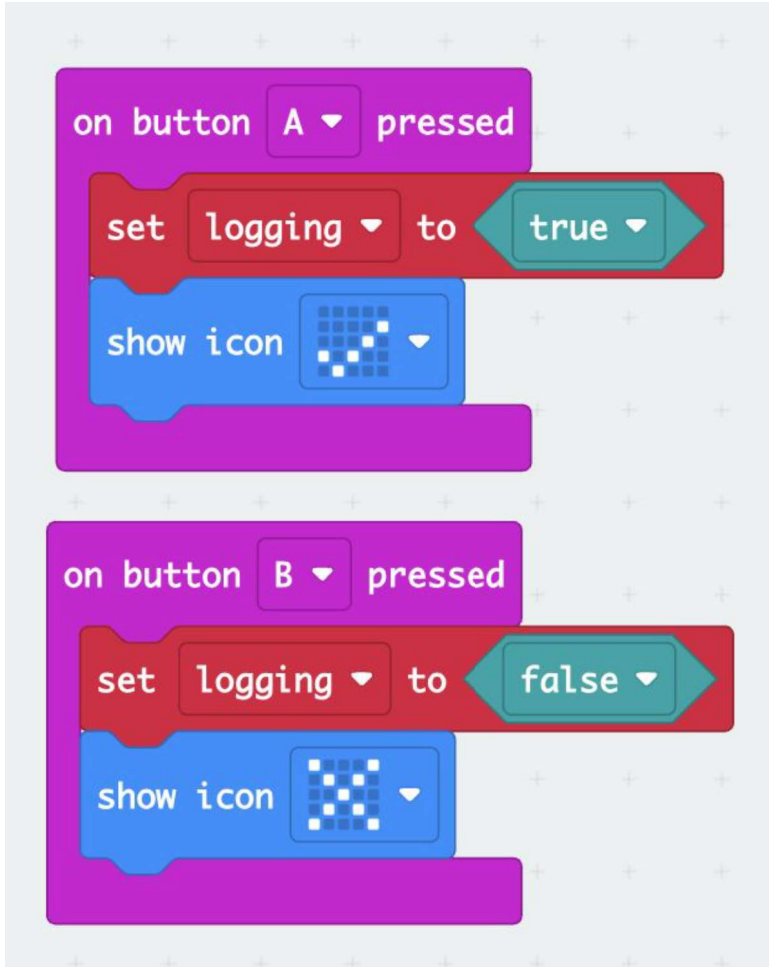
PRIMM teaching method to introduce code:

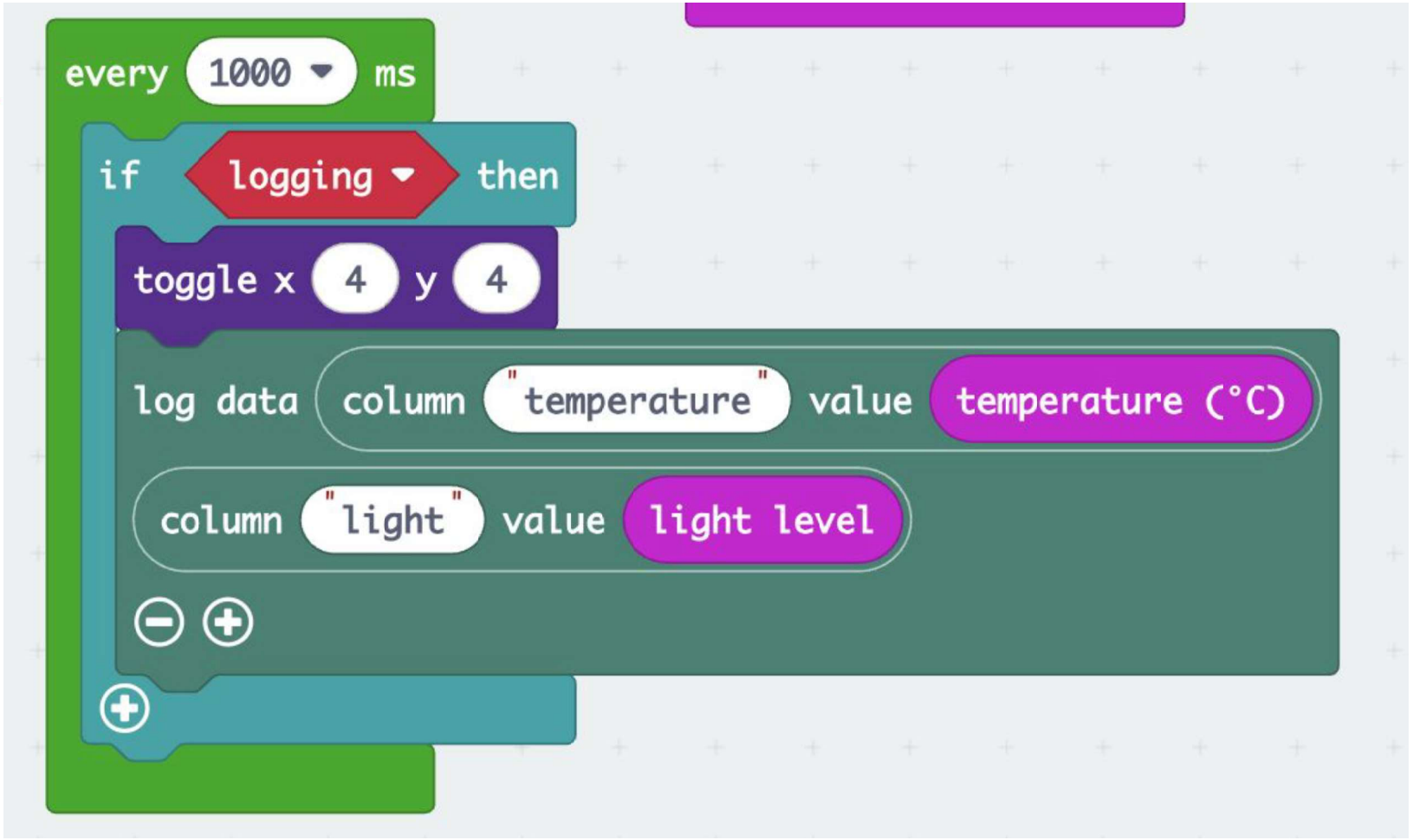
- **P**redict
- **R**un
- **I**nvestigate
- **M**odify
- **M**ake

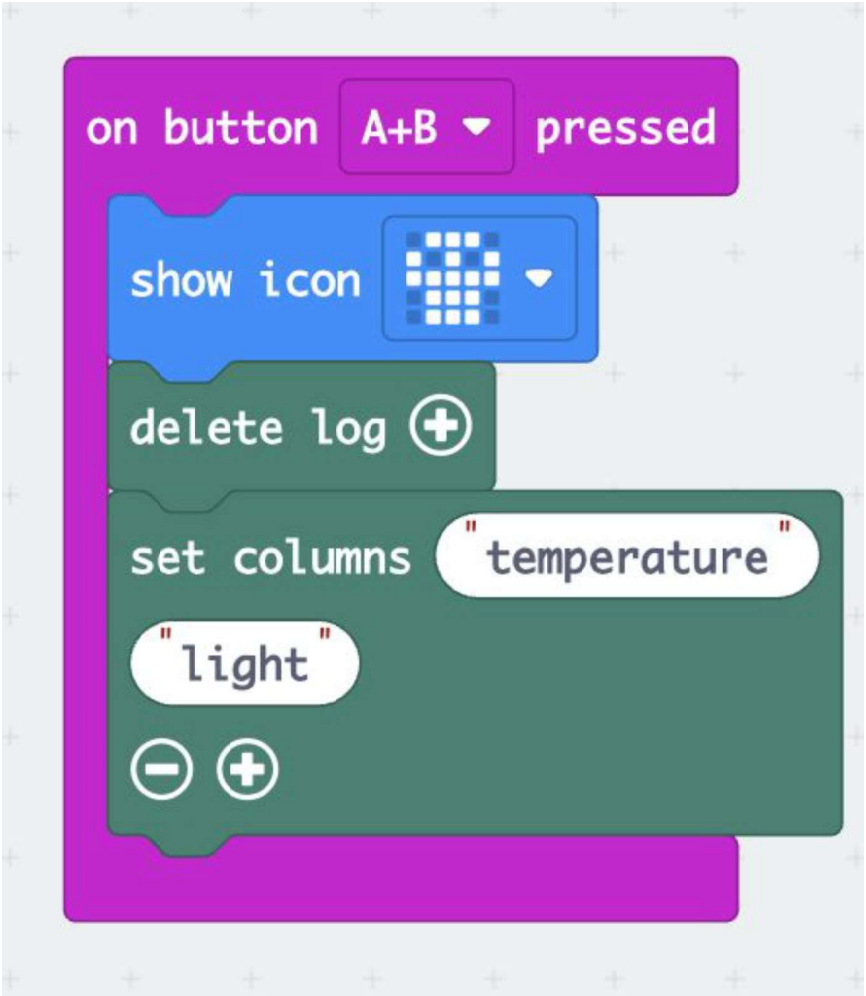
Predict what the program will do

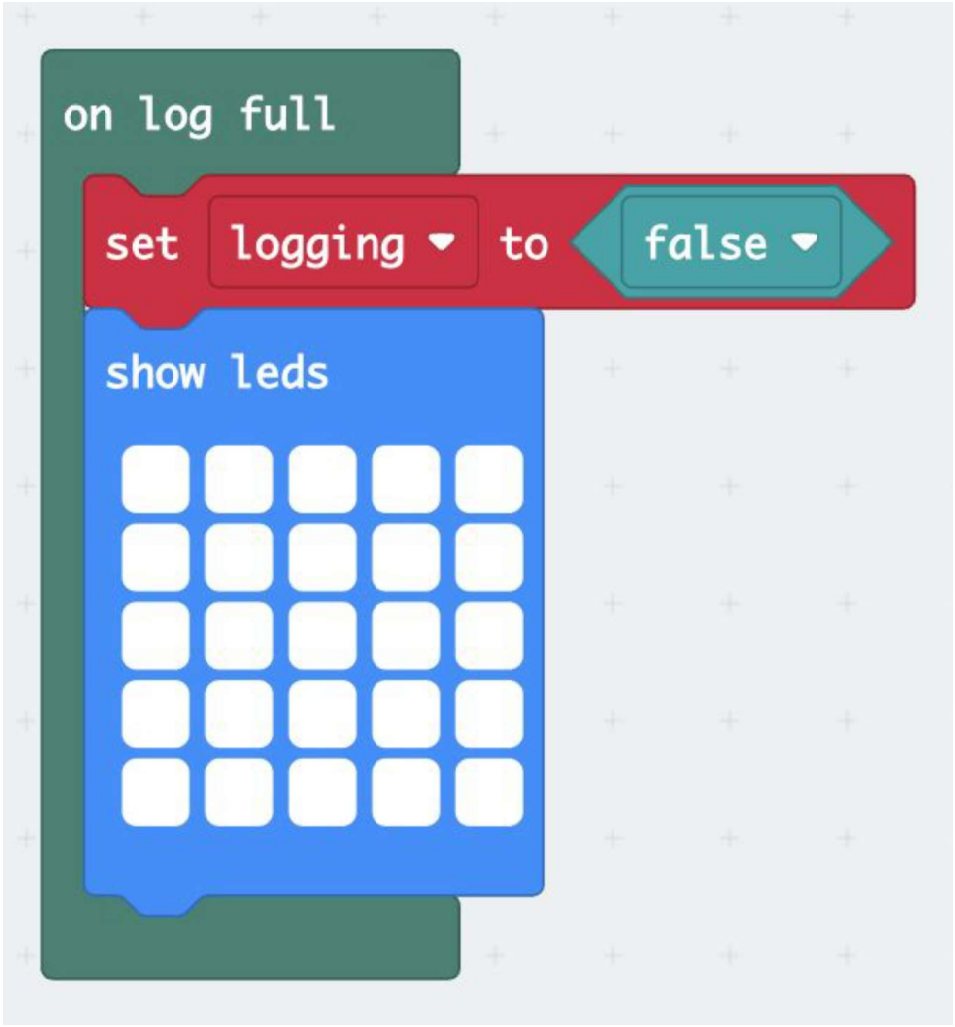



on start
set logging to false
show icon
set columns "temperature"
"light"


on button A pressed
set logging to true
show icon
on button B pressed
set logging to false
show icon


every 1000 ms
if logging then
toggle x 4 y 4
log data column "temperature" value temperature (°C)
column "light" value light level


on button A+B pressed
show icon
delete log
set columns "temperature"
"light"

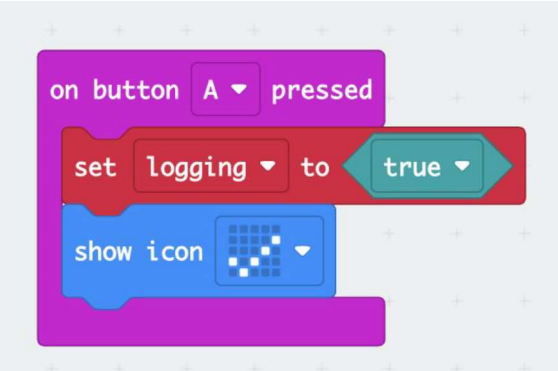

on log full
set logging to false
show leds

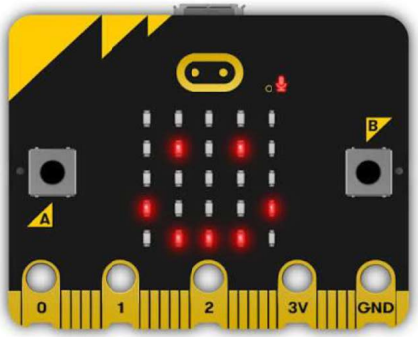
Get the program: bit.ly/templightfloyd

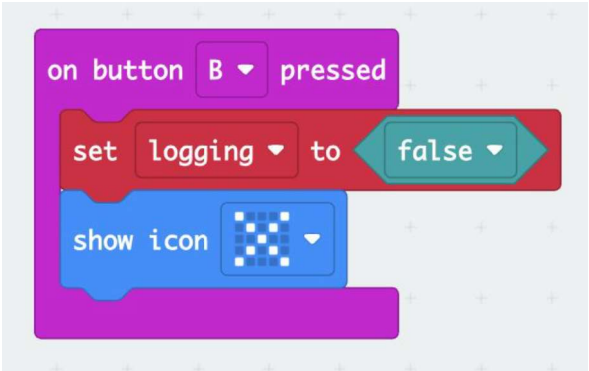
Steps for Data Logging

- ~~Create your program in MakeCode~~
- Send your program to you micro:bit
- Detach micro:bit from computer, and connect battery pack
- Collect data in fun ways
- When done collecting data, plug micro:bit back in
- Open the micro:bit as a folder (File Manager, Explorer, etc)
- Get data off of micro:bit (Filename = “MY_DATA”)
- Explore and analyze data

To collect data





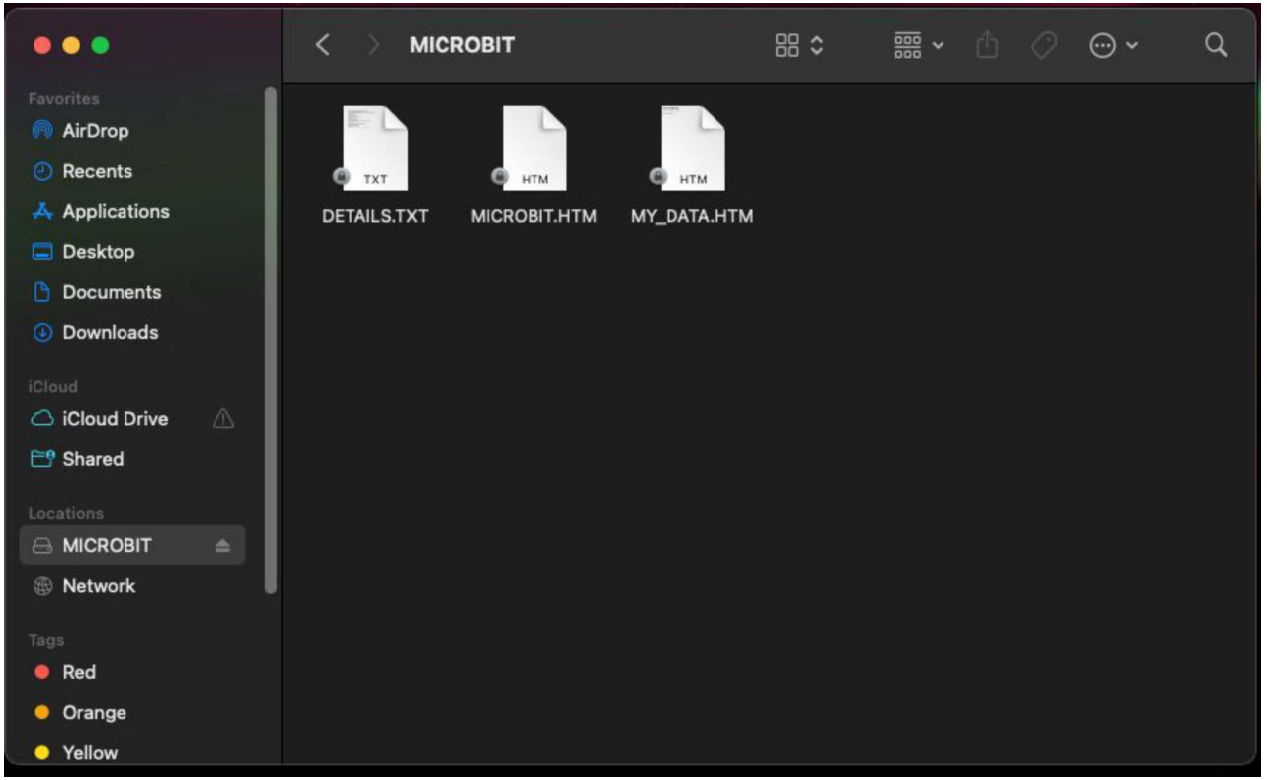


Steps for Data Logging

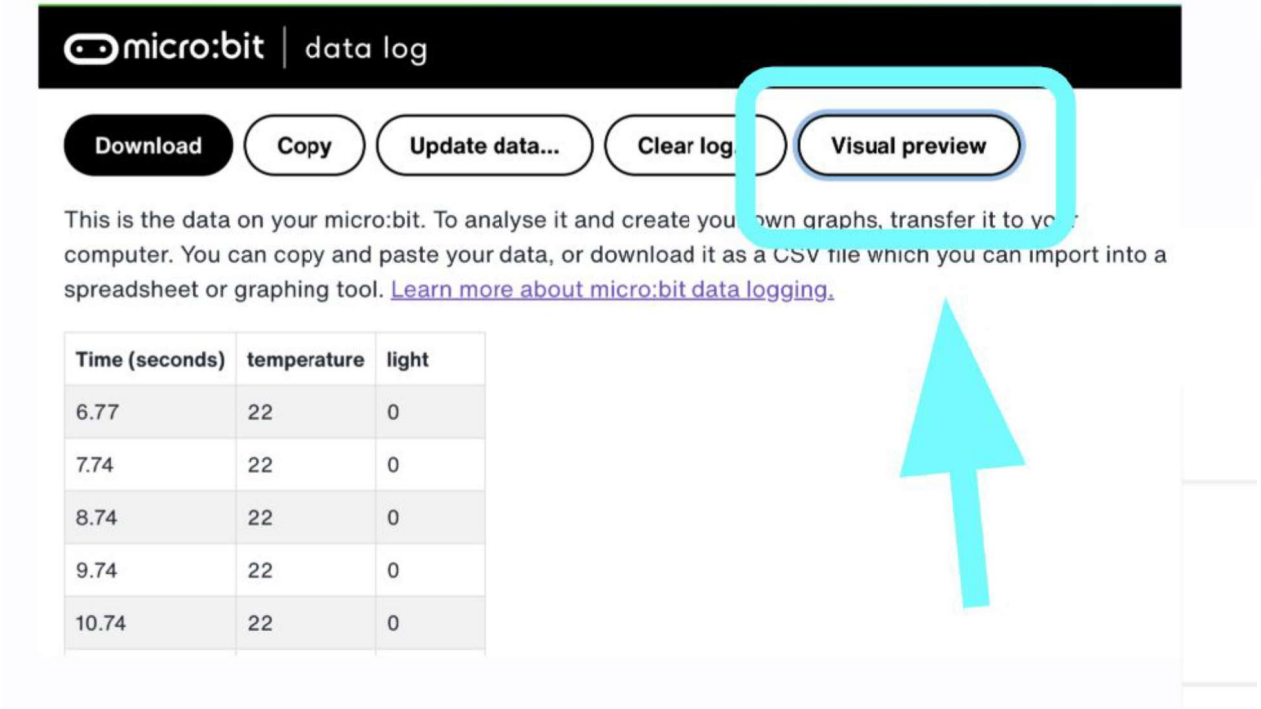
- ~~Create your program in MakeCode~~
- ~~Send your program to you micro:bit~~
- ~~Detach micro:bit from computer, and connect battery pack~~
- ~~Collect data in fun ways~~
- When done collecting data, plug micro:bit back in
- Open the micro:bit as a folder (File Manager, Explorer, etc)
- Get data off of micro:bit (Filename = “MY_DATA”)
- Explore and analyze data

Get to the data you collected

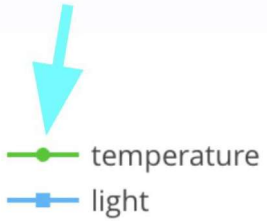
- Open micro:bit as a folder or drive
- Open “MY_DATA.HTM”



Create graphs of your data



Click here to turn these data points off or on



Analyzing Data

- **What do you notice about the data?**
  - No inferences yet, just what do you see/notice
- **What does the data mean?**
  - What does it mean if a line is going up?
  - What does it mean if a line is going down?
  - What does it mean if a line is flat?
- **What changes do you notice in the data over time?**
  - Are they big changes, or small?
  - What happened to cause these changes?

What other data can micro:bit collect?

Built-in sensors:

- Accelerometer
- Temperature sensor
- Light sensor
- Compass
- Touch logo
- Microphone

Attachable sensors:

- Soil moisture sensor
- Water level sensor
- Ultrasonic sensor (distance)
- Magnetic sensors
- Vibration sensor
- Flame sensor

Many more. 3rd party kits (example) are available, or can buy separate components (example)

CreateAI

Slides:
z.umn.edu/microbitstem26

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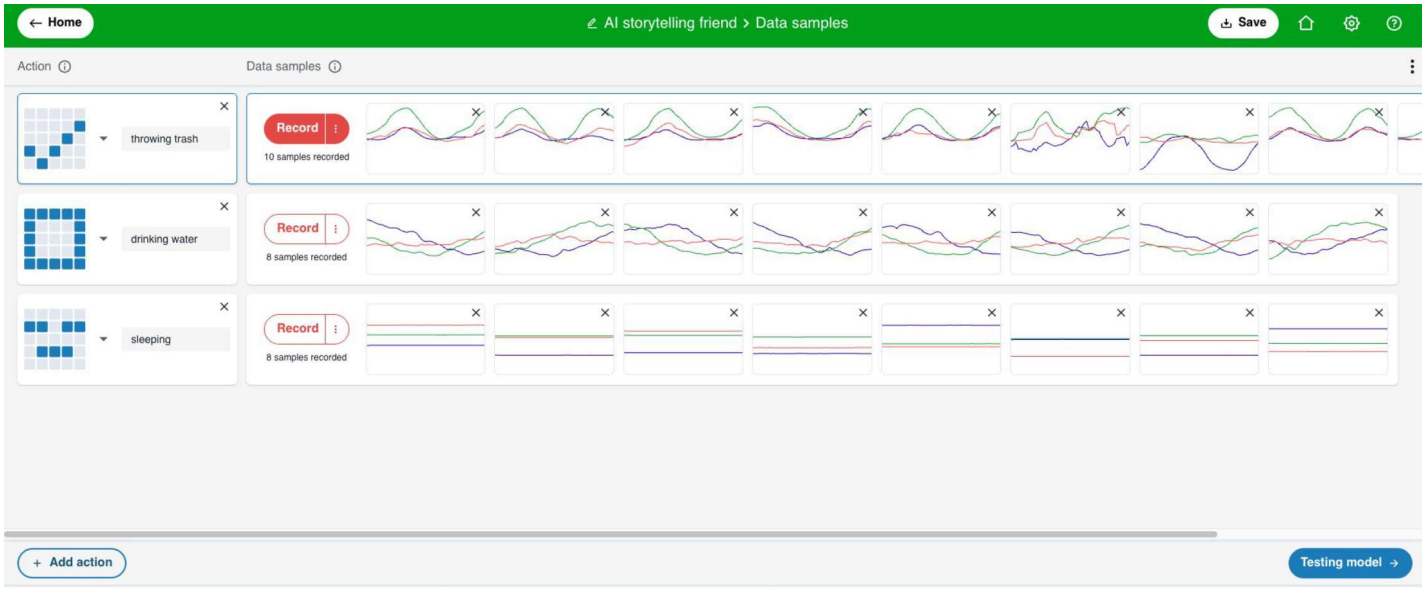
micro:bit CreateAI projects

Projects to connect data collection for movement (X, Y, Z axis) and machine learning/AI



Other resources

Slides:
z.umn.edu/microbitstem26

Curricular resource

From NLC - Iskigamizigan: Sugar Bush Unit

This unit, designed for grades 5-7, explores the traditional practice of Iskigamizigan (Sugar Bush) and the use of micro:bits for data collection and analysis in maple sap production over 6 - 10 instructional days. Students will learn about the cultural and historical significance of maple syrup production in Native American communities, as well as the importance of good stewardship and gratitude towards the earth. Through hands-on activities, students will practice tapping trees, monitoring sap volume, boiling sap, and analyzing data to improve their sugar bush practices. They will also discuss the role of technology in modern-day sap production and reflect on the balance between tradition and innovation in preserving natural habitats. By the end of the unit, students will have a deeper understanding of the interconnectedness between culture, nature, and technology, and be inspired to make positive changes in their relationship with the environment.

Save the date!

Slides:
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Northern Lights Collaborative for Computing Education

EmpowerMN CS+AI 2027

- Aug 3 - 5, 2027
  - Twin Cities UMN Campus
- Choose one from a selection of 3-day workshops
- 2026 workshop offerings:
  - Intro to CS/CT, CS integration with Physical Computing, Introduction to AI, AI in CS, Data Science, Cybersecurity, Raspberry Pi Foundation Experience CS

- Join the NLC mailing list for news and updates!

Thank you!

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Northern Lights Collaborative for Computing Education

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nlcollaborative@umn.edu
LinkedIn: Northern Lights Collaborative

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W, M, G	B, M (W-WCAGAA only)	B, M		
W, G	B, M, G			
W (G-WCAG AA only)				
W only (small text does not pass WCAG AAA)	B only	W-large text B-small text	W only (small text does not pass WCAG AAA)	B only

Color Accessibility:
B - OK to use with black text
W - OK to use with white text
G - OK to use with UMN Gold text (#ffcc33)
M - OK to use with UMN Maroon text (#7a0019)

Check other combinations at
https://webaim.org/resources/contrastchecker/

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