

March 05, 2026

Micro:bit

Hands On STEM & CS

Physical Computing Exploration

Join Zoom Meeting



<https://eiu.zoom.us/j/89680498134?pwd=VGmkaZIRsBgGQHyWsSQuHMQEDer66M.1>

Explore Creative Teaching with Micro:bit:

*Free: Professional
Development Session*

Learn how to easily integrate
Micro:bit technology.

Student PD Certificate or
1 CPDH Unit for licensed teachers

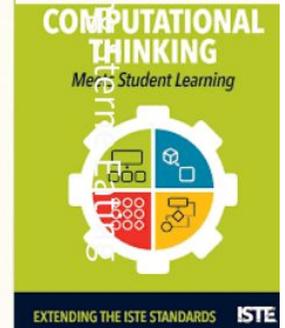
Date: Thursday, March 5th, 4:30-5:30 PM

Buzzard Rm 2445

Join in-person or on Zoom



- ✔ Learn how to easily integrate Micro:bit technology into your classroom across math, science, arts, and more.
 - ✔ Exploration, Problem Solving, Real World Applications
 - ✔ Meets Illinois expectation of CS in classrooms, but no experience needed
- Appropriate for all grades. Best grades 2-12





Sign-in Form

Needed to Receive Certificate or CPDH unit

<https://docs.google.com/forms/d/e/1FAIpQLScO6iH1a6hFk7V-3jm09kSvHgtiAtYJ4ee0Htkoy5PxO8ZHGw/viewform?usp=publish-editor>



**GROW YOUR
OWN TEACHERS**

ILLINOIS

EIU - Rural Schools Initiative
G.Y.O - Grow Your Own Cohorts
Director Dr. Cecil Smith

Monthly Tech PD Sessions

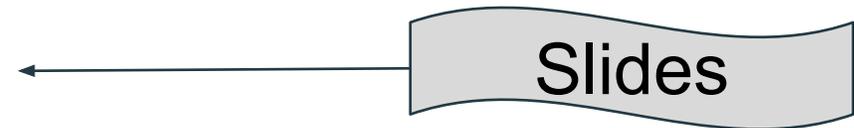
EIU RURAL SCHOOL INITIATIVE

Terence Sullivan

tjsullivan2@eiu.edu

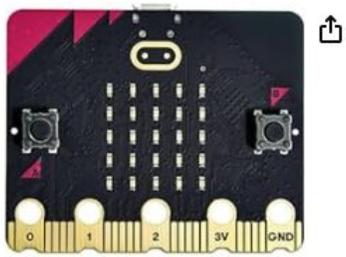
Buzzard 2137





Terence Sullivan (tjsullivan2@eiu.edu)

<https://docs.google.com/presentation/d/1rb7DgijNcWcjB8DdWFpacw4he1hzWH-j/edit?usp=sharing&ouid=107958406510947221327&rtpof=true&sd=true>



KEYESTUDIO Micro:bit V2 Go Kit Original Microbit V2 Starter Kit, with Micro:bit V2, Battery Holder, Micro USB Cable

Visit the KEYESTUDIO Store

4.6 ★★★★★ (130) | Search this page

200+ bought in past month

List Price: ~~\$25.99~~ Details

Educator Price **\$21.55**

You Save: **\$4.44 (17%)**

Prefer to be invoiced for your order? Choose [Pay by Invoice](#) method at checkout.

Available with free Prime shipping from [other](#) [countries](#)

Brand	KEYESTUDIO
Model Name	KEYESTUDIO Micro:bit V2
Connectivity Technology	USB
Operating System	Linux
Wireless Communication Standard	Bluetooth

About this item

- Includes the BBC Microbit V2.2 which has ne LEDs, 2 buttons, motion sensor, buzzer, light



BBC micro:bit v2 Club Pack (10x)

Visit the MICROBIT Store

4.7 ★★★★★ (33) | Search this page

200+ bought in past month

List Price: ~~\$210.50~~ Details

Business Price **\$171.95**

FREE Returns

You Save: **\$38.55 (18%)**

Prefer to be invoiced for your order? Choose [Pay by Invoice](#) as your payment method at checkout.

Brand	MICROBIT
Hardware Interface	Bluetooth
Color	Red, Yellow, Green, Blue
Compatible Devices	Desktop
Data Link Protocol	Bluetooth, USB
See more	

About this item

- 10 x micro:bit v2 board
- 10 x micro USB cables
- 10 x battery holders



micro:bit v2.2 Go Club 10-Pack - Batteries and USB Cables Include

PRODUCT ID: 4833

Add to Cart

\$199.95

In stock

Get Started – FarmBeats for Students micro:bit version

Step 1 - Download the free curriculum and activities.

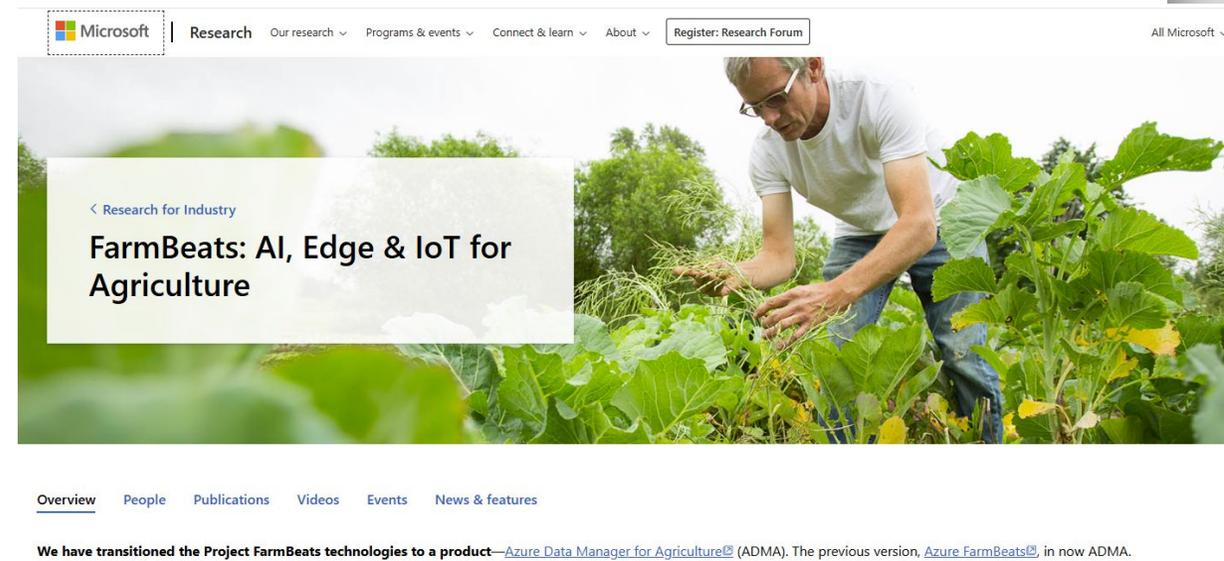
- [Section 1: Gathering Data through Sensors with micro:bit](#) (suitable for grades 6+/ages 11+)
- [Section 2: Analyzing Big Data](#) (suitable for grades 9+/ages 14+)
- [Section 3: Unlocking Data Insights with AI](#) (suitable for grades 9+/ages 14+)

Step 2 - [Purchase affordable hardware kits.](#)

Step 3 - [Discover how to implement FarmBeats for Students with free educator training at the Microsoft Learn Educator Center.](#)



This video features the Raspberry Pi hardware from a previous version of FarmBeats for Students.

A screenshot of the Microsoft Research website for FarmBeats. The page features a navigation bar with the Microsoft logo, "Research", and various menu items like "Our research", "Programs & events", "Connect & learn", and "About". A "Register: Research Forum" button is also present. The main content area has a background image of a man in a field and a white text box with the title "FarmBeats: AI, Edge & IoT for Agriculture". Below the title is a navigation menu with "Overview", "People", "Publications", "Videos", "Events", and "News & features". At the bottom, there is a paragraph stating: "We have transitioned the Project FarmBeats technologies to a product—Azure Data Manager for Agriculture® (ADMA). The previous version, Azure FarmBeats®, is now ADMA."

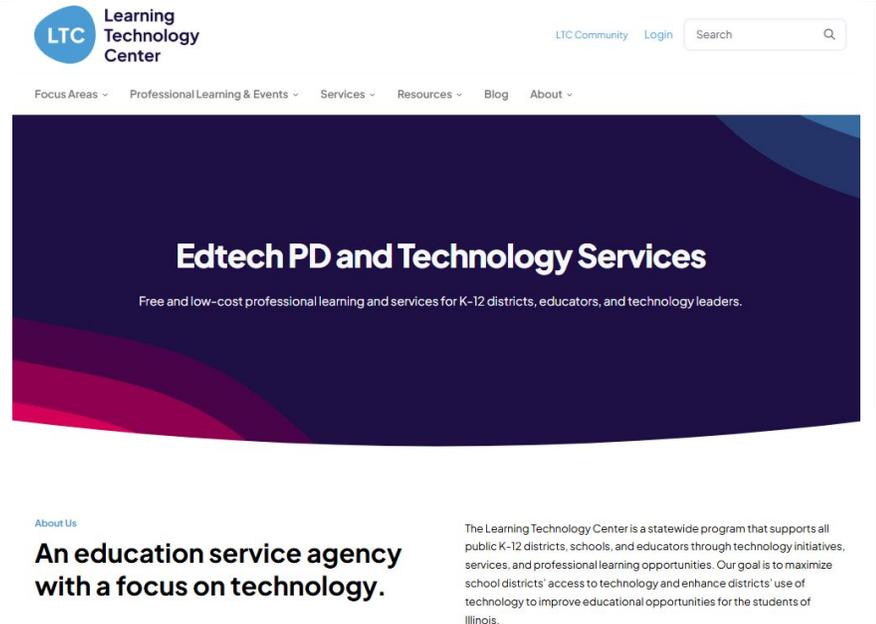
LTC & AIRSS

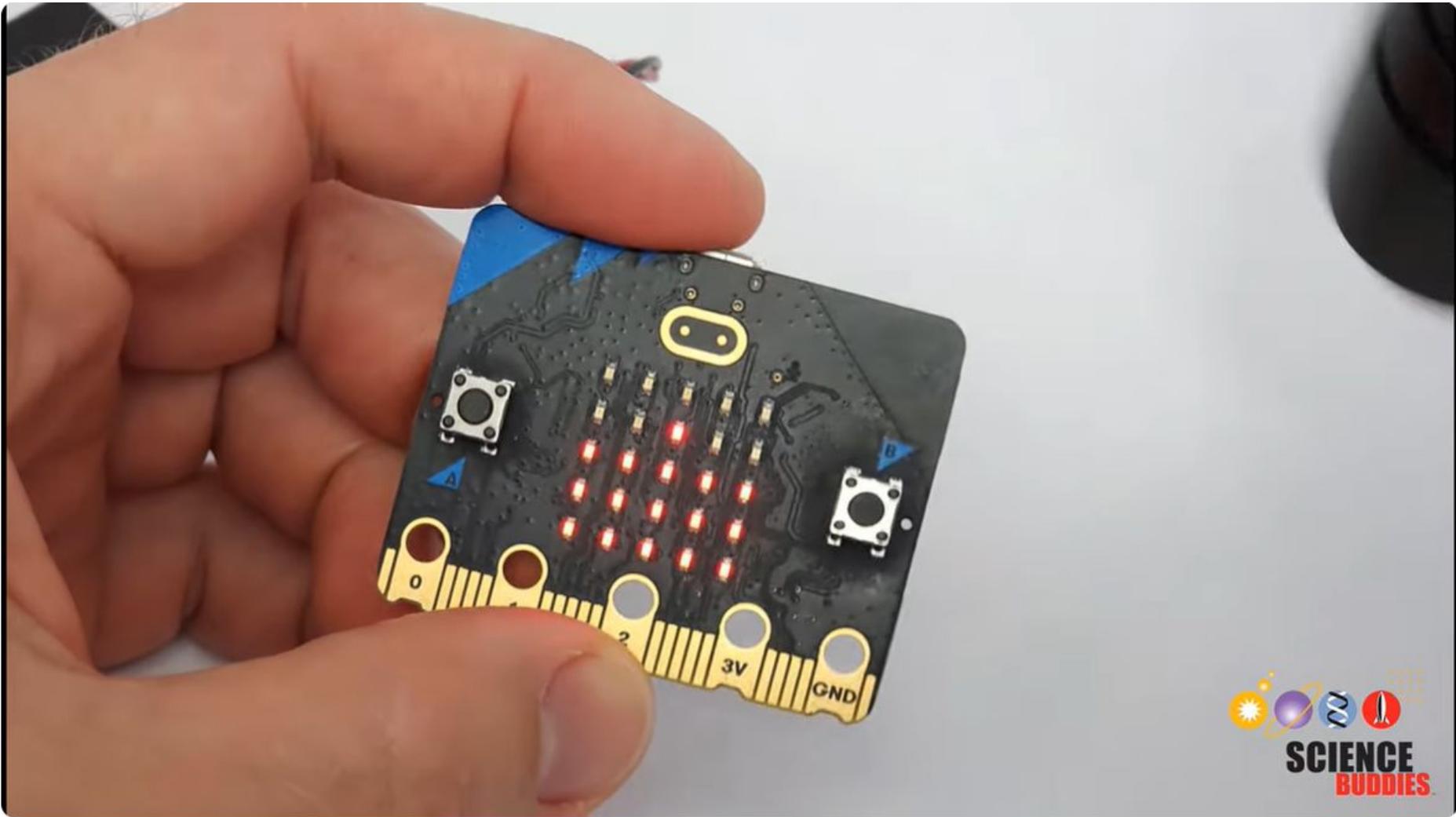
Illinois Learning Technology Center

March 5th through AIRSS:

<https://airssedu.org/post/growing-rural-computer-science-lessons-through-ag-education/>

In this interactive webinar with the Learning Technology Center, we'll show you how to introduce students to sensory computing using the micro:bit. This session is designed for everyone: no prior coding experience is required, and these activities integrate seamlessly into any subject area. Whether you're a tech expert or a total beginner, join us on March 5 to see how physical computing prepares your students for a future driven by innovation





How to use micro:bit light sensor | Tutorial #6

https://www.youtube.com/watch?v=tfk9F09I_5Y

LIGHT SENSING WITH MICRO:BITS

Details

Activity Length
45 min, with
additional data
collection over longer
periods of time

Topics
Applied Design and
Technology
Coding
Plants

Language
English

Print



We use technology everyday as a tool to help us learn and build and travel, but how can we use technology to help the world around us? In the following activity, you will use the micro:bits to help a real plant grow! Don't have micro:bits but are local? [Sign up](#) for access to our equipment loaner kits!

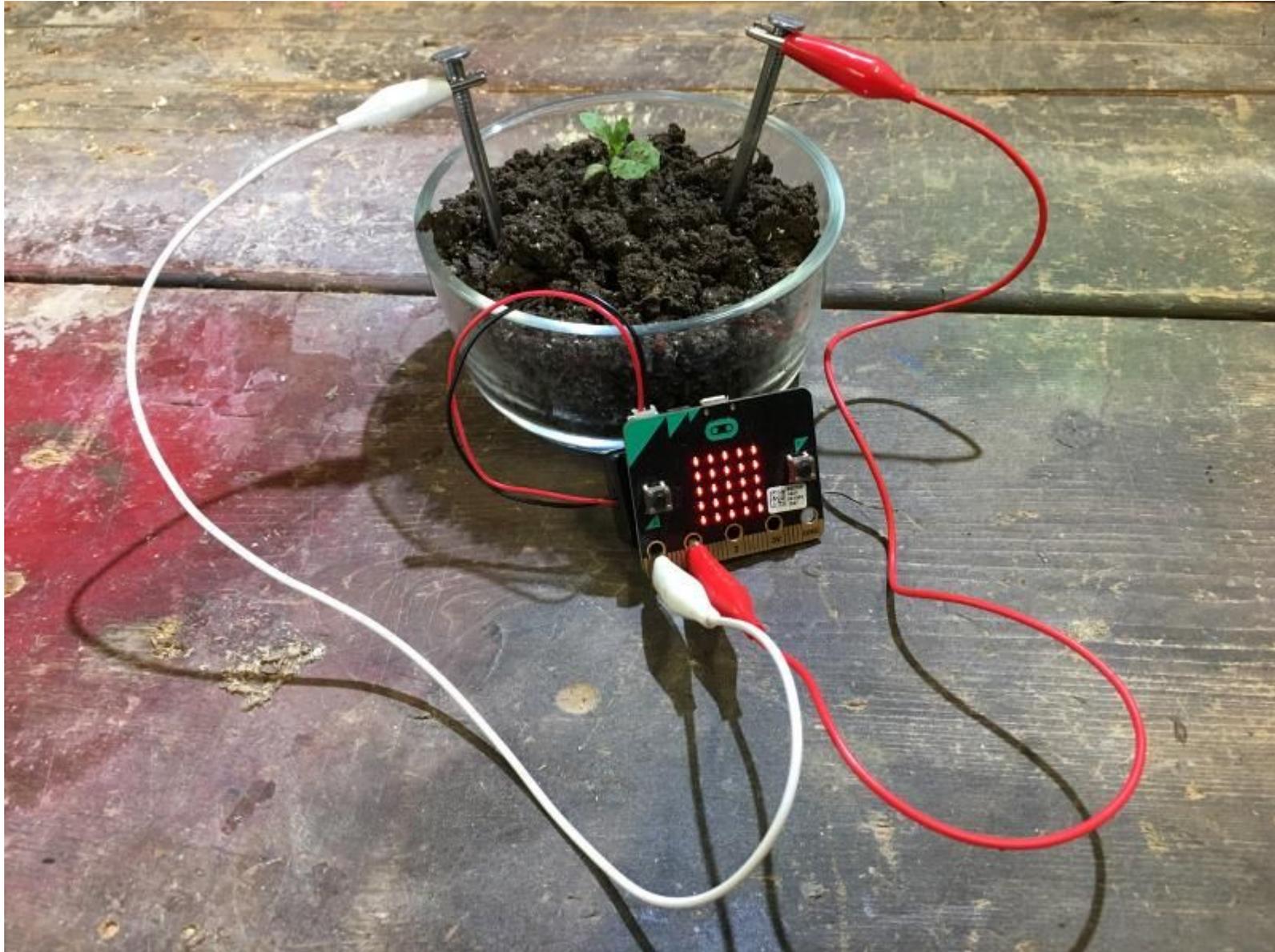
Small plants growing in carton chicken egg box in black soil. Break off the biodegradable paper cup and plant in soil outdoors. Reuse concept.



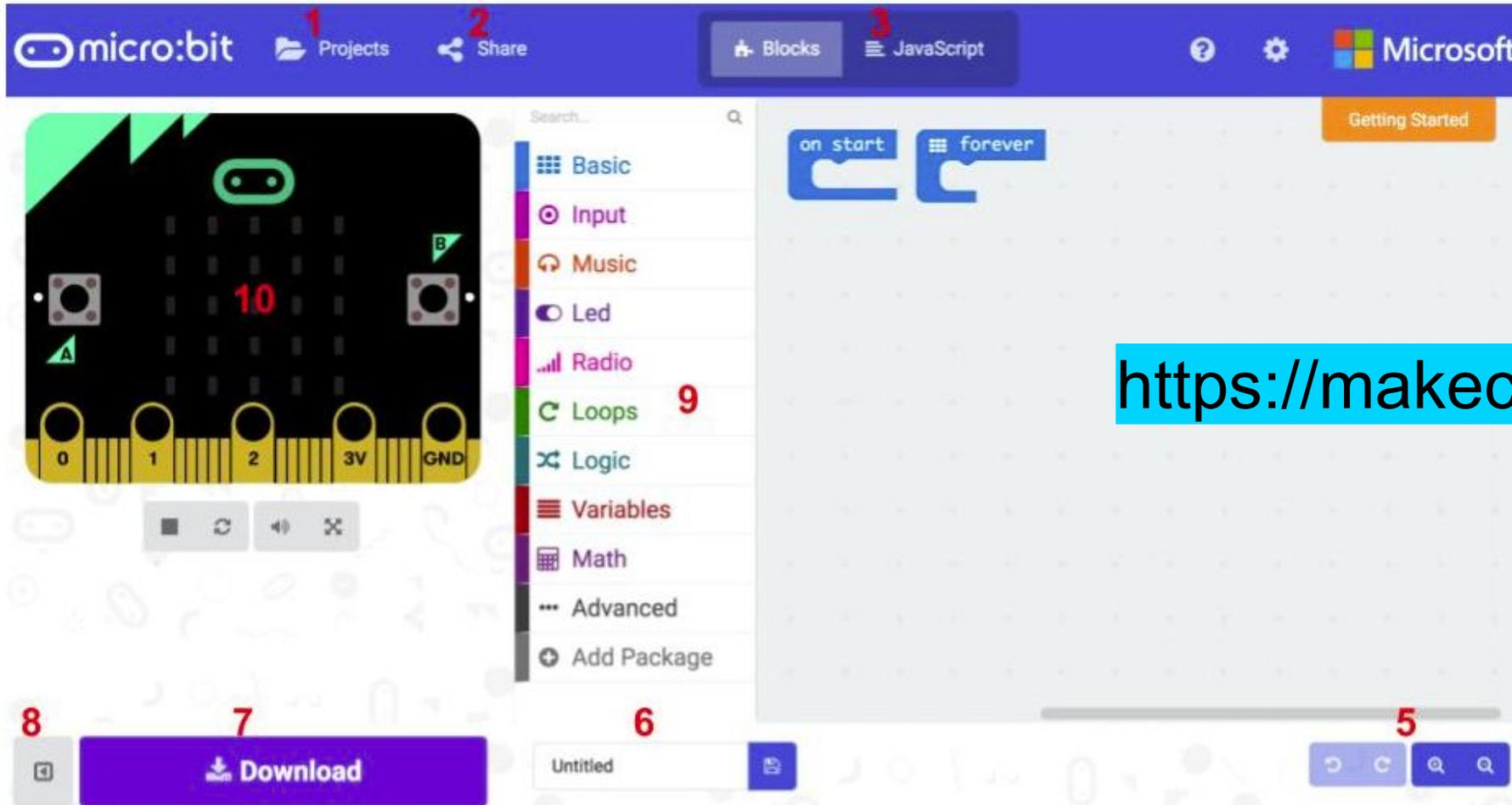
Light needed for healthy plants

How plants grow toward the light
(phototropism)

Monitor “rate of growth” with light and
with temperature.



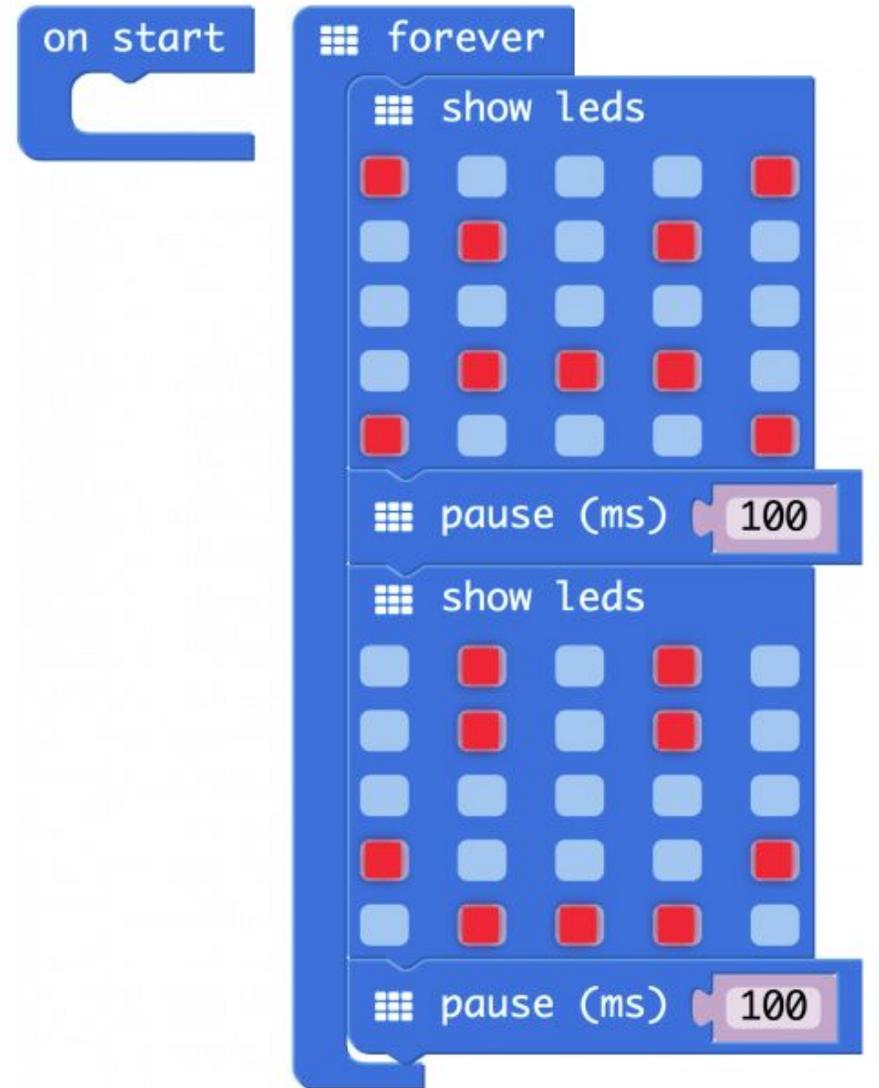
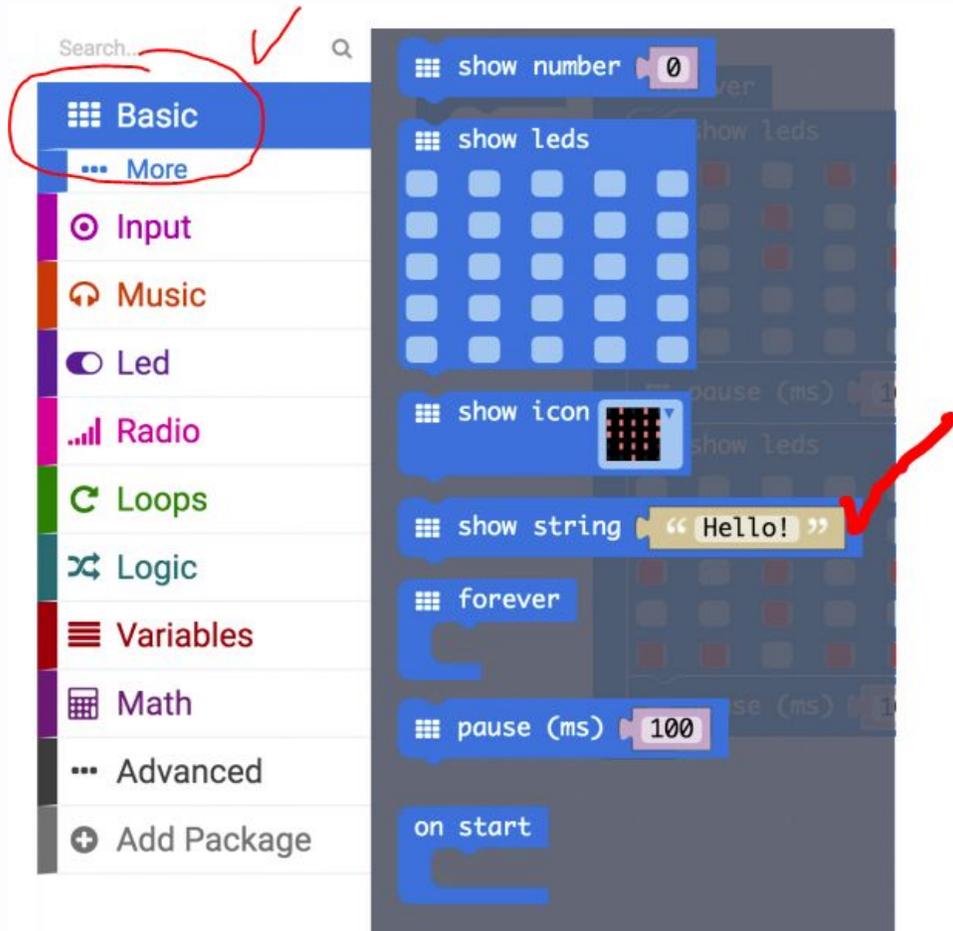
Using Makecode - www.microsoft.com/en-us/makecode



<https://makecode.microbit.org/>

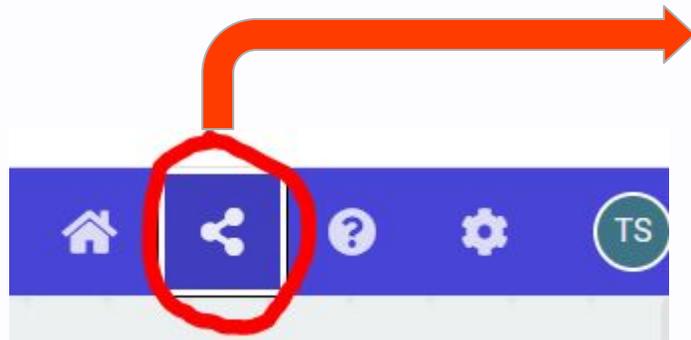


Hello World!

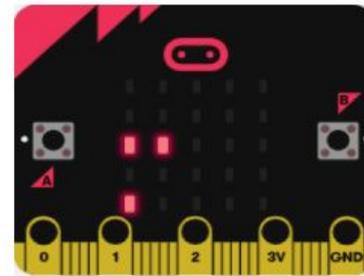


Saving your project

- Download the “.hex” file to your computer
- Get the Share Link
- Move a copy to the cloud to share with others



Share Project



Project Link

<https://makecode.microbit.org/S77166-96616-76425-66140>

Copy

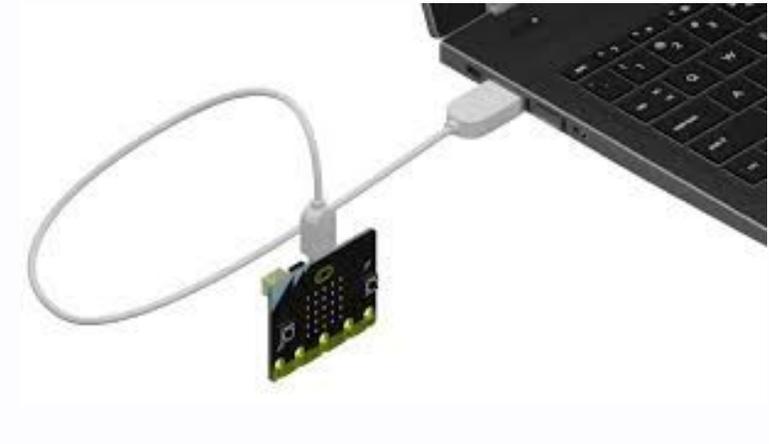
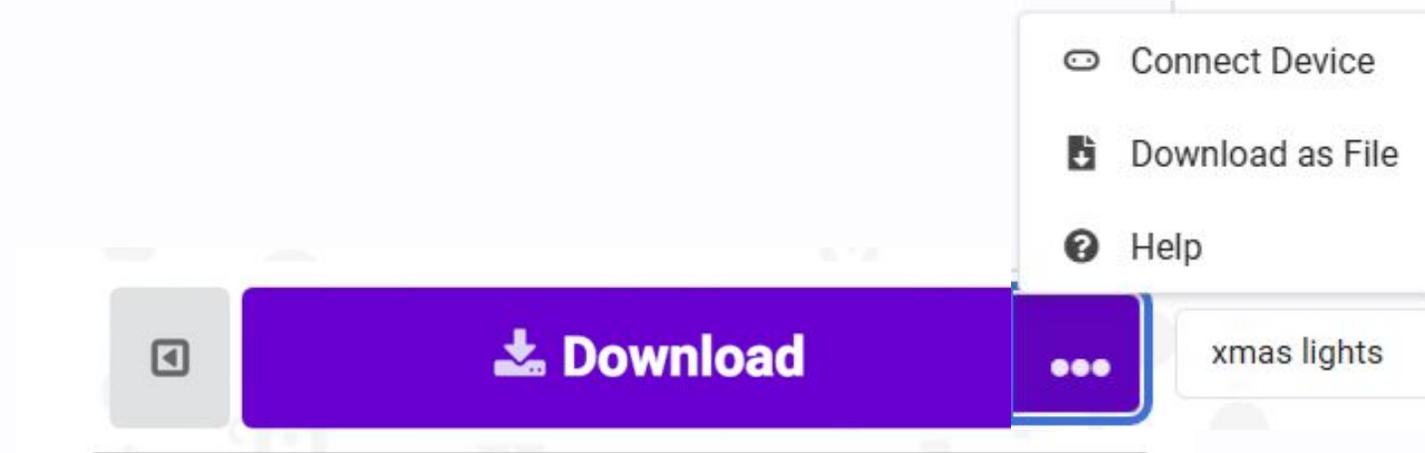


Move project onto the Micro:bit Device

- Sync/Pair the Microbit with your computer using a USB cable
- Use the **DOWNLOAD** button choosing download to Micro:bit

OR

- Copy the “.hex” file directly onto the Micro:bit





Speakers



Katie Henry

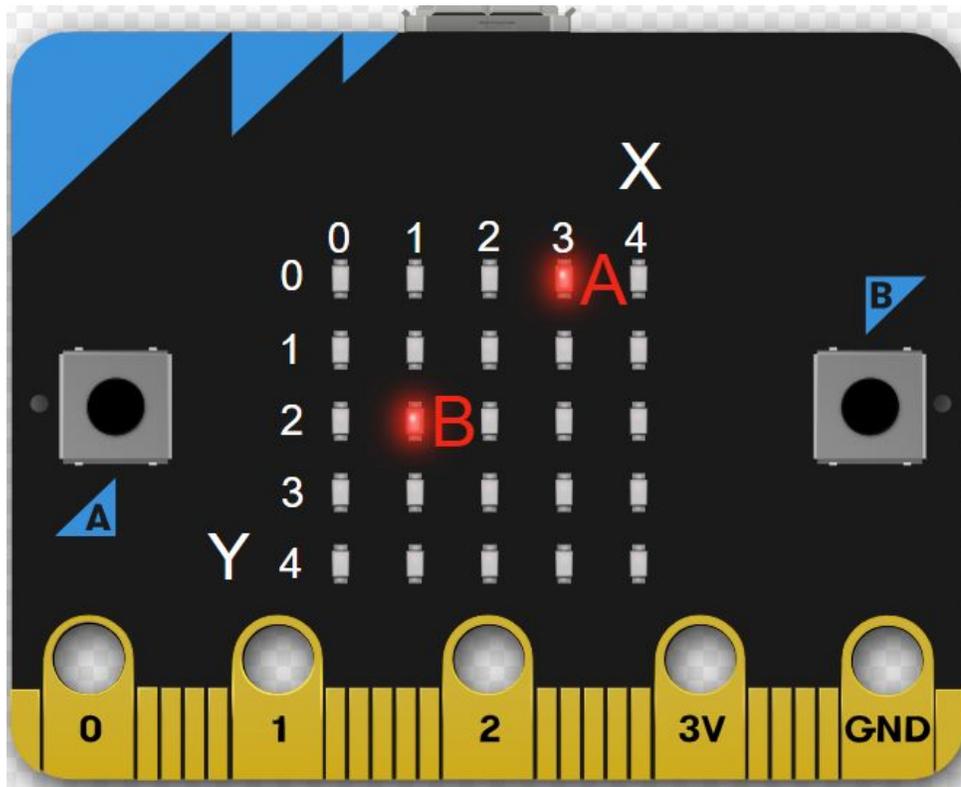
Head of Partnerships,
North America

Micro:bit Educational
Foundation



Jacqueline Russell

Product Manager
Microsoft



LEDs are *diodes* that emit light, and as diodes they only allow current to flow in one direction, so it's important to connect them correctly. They should have a long (+) wire (often called a leg) and a shorter (-) wire.

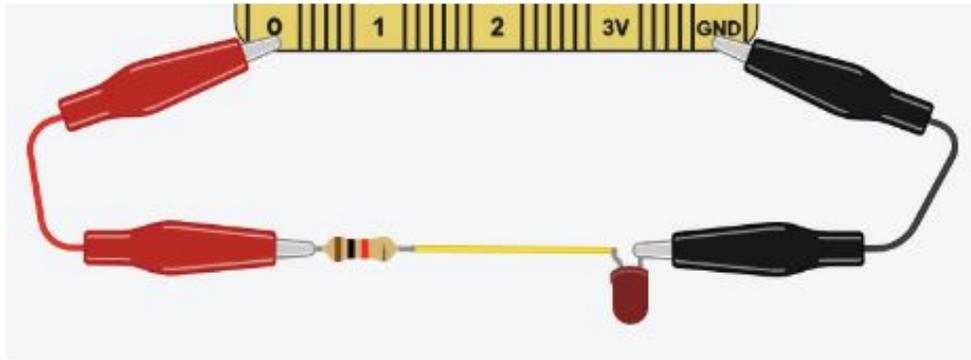


The micro:bit can switch the LED on/off by providing power from one of its pins eg Pin0 using a digital write function.

The reference documentation of the individual LED you are using will list it's current rating. It is often around 20mA and providing any more than this will likely burn out the LED.

The micro:bit has an *on board budget of 90mA(v1) and 190mA(V2) to provide to peripherals.* Exceeding this could damage the device. Each pin of the micro:bit also has a *current supply limit of 5mA* and a maximum of 3 pins can be configured in this high drive mode at one time.

The LED can be driven by connecting Pin0 to the resistor and then the + leg of the LED and connecting the - leg to GND.



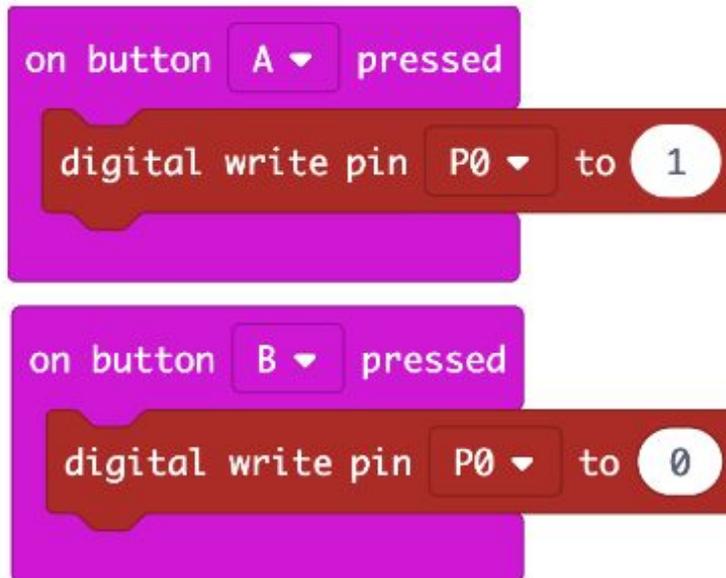
You can connect the components with Alligator clips or by using a [breadboard](#).

Programming

Using a digital write, we can change the status of the LED from off(0) to on (1).

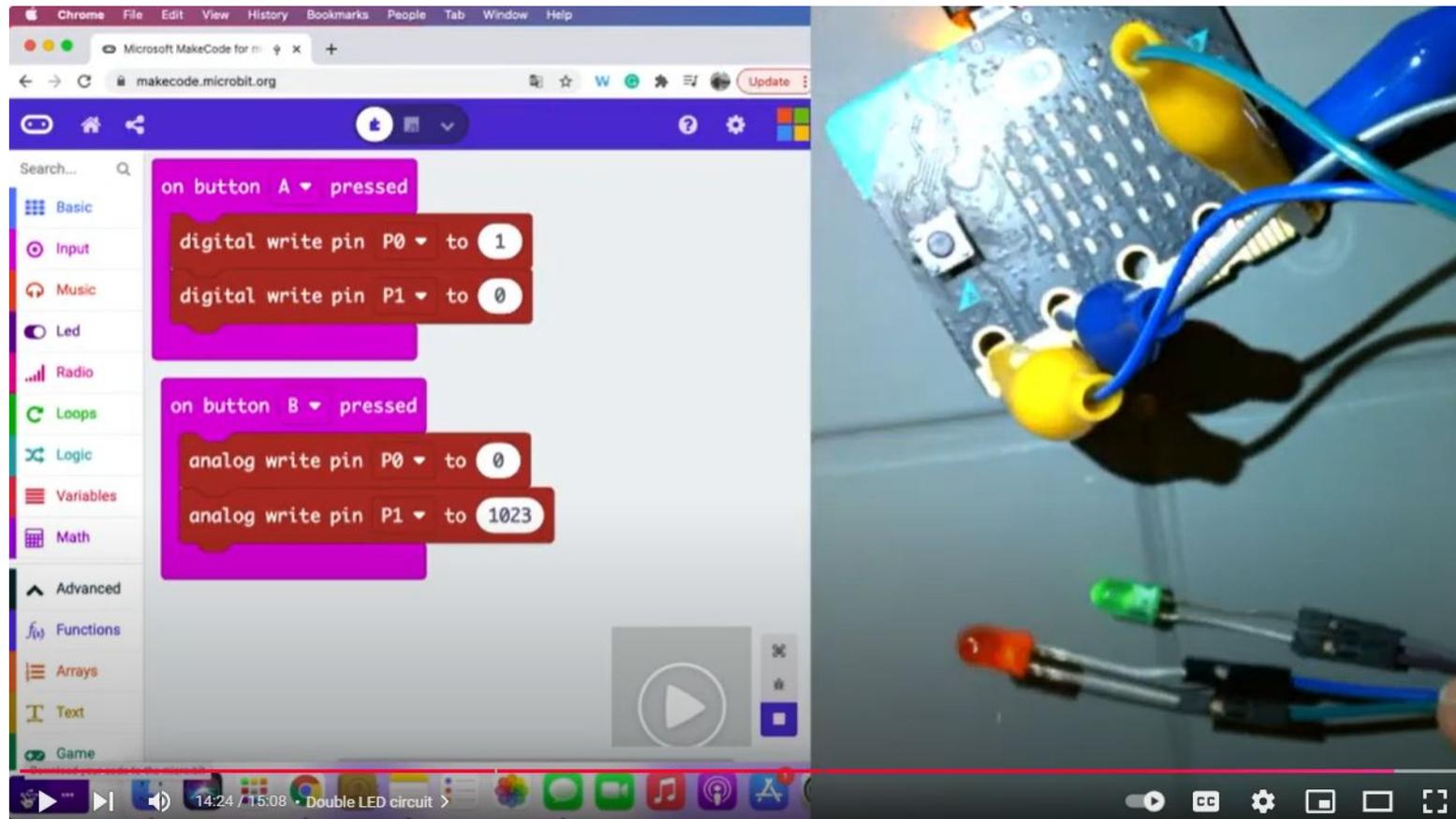
MakeCode

In this program we are setting the pin to 1 on button A pressed and 0 on button B pressed.



https://makecode.microbit.org/_imPV5u5FgdLK

Python



<https://www.youtube.com/watch?v=tjMadAodi-4>

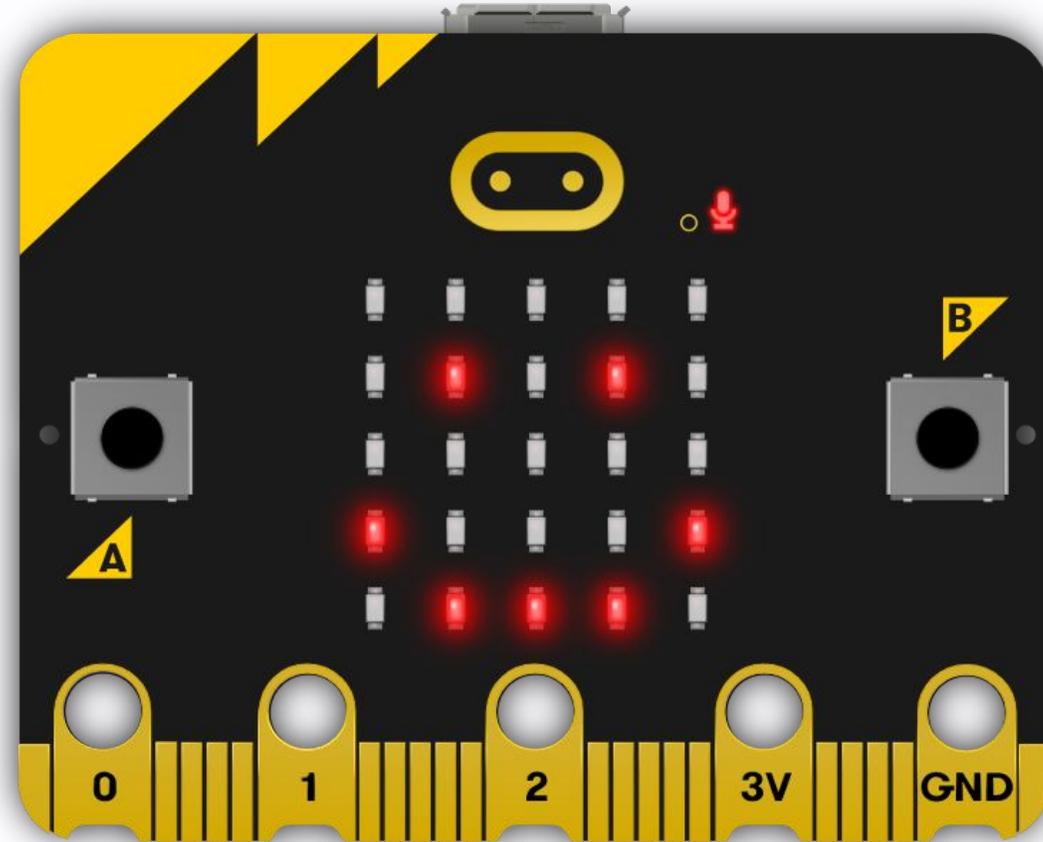
Microbit & LED

It is also possible to purchase LEDs with inbuilt current limiting resistors if you want to keep the circuit as simple as possible.

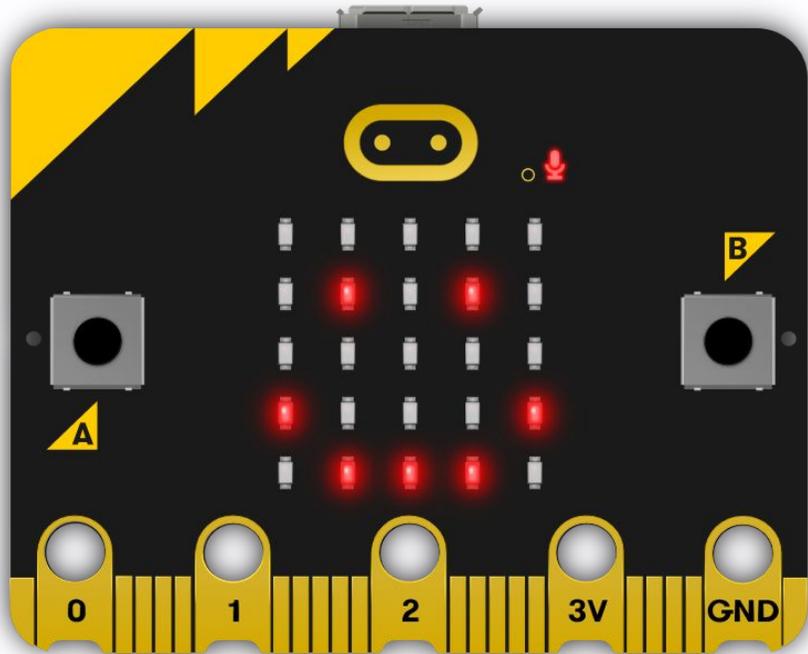
- Explain Resistor Role -
<https://kitronik.co.uk/blogs/resources/which-resistor-should-i-use-with-my-led>
 - Calculator - <https://kitronik.co.uk/blogs/resources/led-resistor-value-calculator>
 - good starter 150 to 220 Ohm -
- MakeCode sample - <https://makecode.microbit.org/83758-95168-93398-40745>
- Connect LED to Micro:Bit pins -
 - <https://support.microbit.org/support/solutions/articles/19000101863-connecting-an-led-to-the-micro-bit>
- How-To for Micro:Bit and LED - <https://www.teachwithict.com/leds.html>

- Micro:Bit LED - onboard 25 by position coding -
<https://makecode.microbit.org/reference/led>

What is a micro:bit?



micro:bit



Affordable

~ \$17

Accessible

Available in 70+ countries

Compatible

Plug into any computer

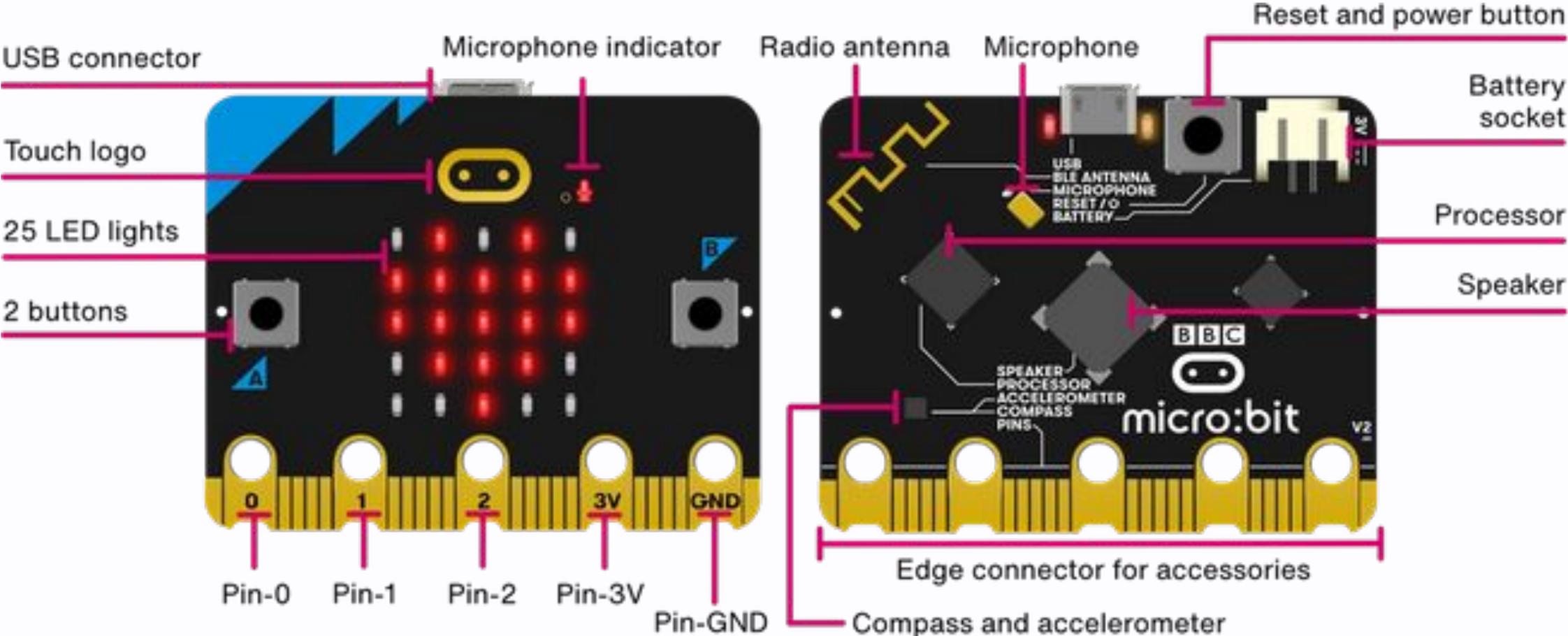
Micro:bit Educational Foundation

“Inspire every child to create their best digital future”



GROW YOUR OWN TEACHERS
ILLINOIS

Low Floors and High Ceilings



What is Physical Computing?



Physical Computing

of or relating to physics
and the natural world

the use or operation
of computers

interactive physical systems or devices that can
be programmed through software

Hardware  Software

Components of a Physical Computing System

Sensing *input*

Networking *communication*

Actuation *output*

Power *battery (often)*



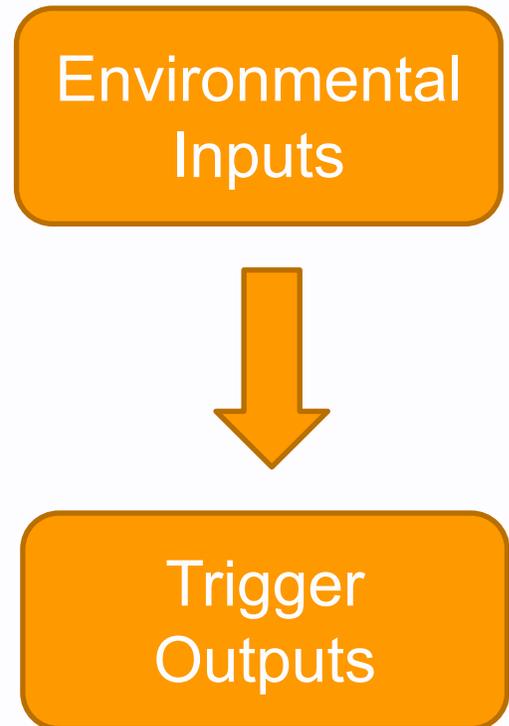
Physical Computing is focused on Sensing + Actuation

Sensing

mouse	pressure	button/switch	temperature
keyboard	location	oxygen	rainfall
microphone	orientation	blood sugar	humidity
card reader	acceleration	heartbeat	air quality

Actuation

screen	LED	insulin pump	lighting
printer	motor	pacemaker	heater
speaker	thruster	ventilator	sprinklers



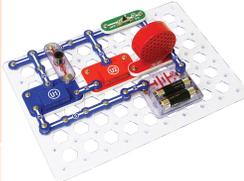
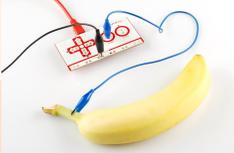
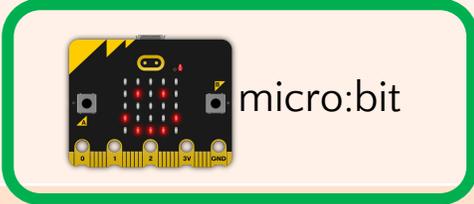
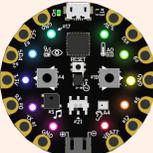
Why is Physical Computing a more inclusive approach to Computer Science?

- Holistic view of Computing (Hardware, Software, Networking, Data)
- Learning by doing
- Project-based approach
- Creativity and Personalization
- Engaging! Gets students using their hands...
- Trial & Error
- Constructing Knowledge
- Collaboration
- Design Thinking

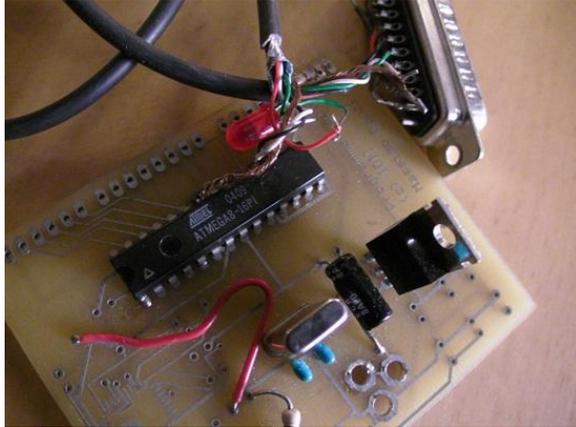


Physical Computing devices today

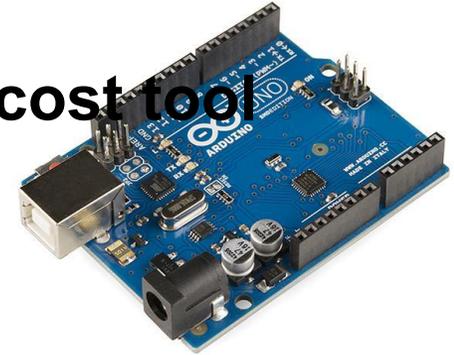
Easier, cheaper, more choices than ever before

Categorization	Examples		
1. Packaged electronics, no programming		Snap Circuits	 littleBits  Chibitronics
2. Peripheral devices, need PC during use		Makey Makey	 Phidgets  Vernier Sensors
2. Packaged robots, programmable via PC or phone		Sphero	 LEGO  Wonder Workshop
4. Board-level embedded devices, need PC to program, but can operate as standalone device		Arduino	 micro:bit  Circuit Playground Express
5. Board-level general purpose devices, don't need PC		Raspberry Pi	 Beagle Bone  Odroid

Maker Movement



Created – student project to create a simple, low-cost tool
prototypes

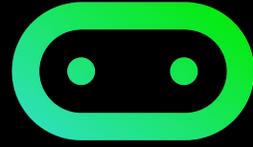


2012 Raspberry Pi created – low-cost single-board, full computer with many applications

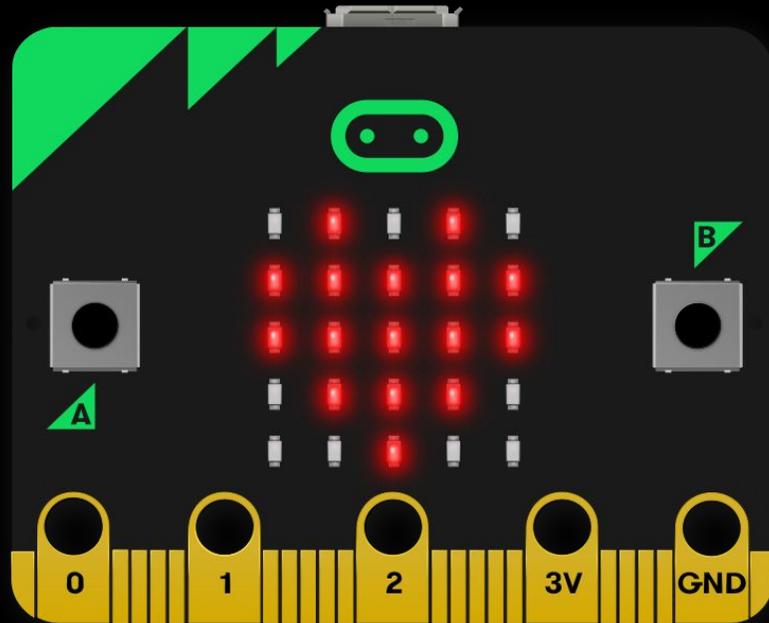


2015

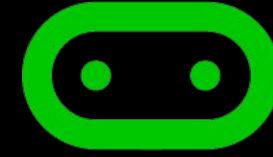
BBC



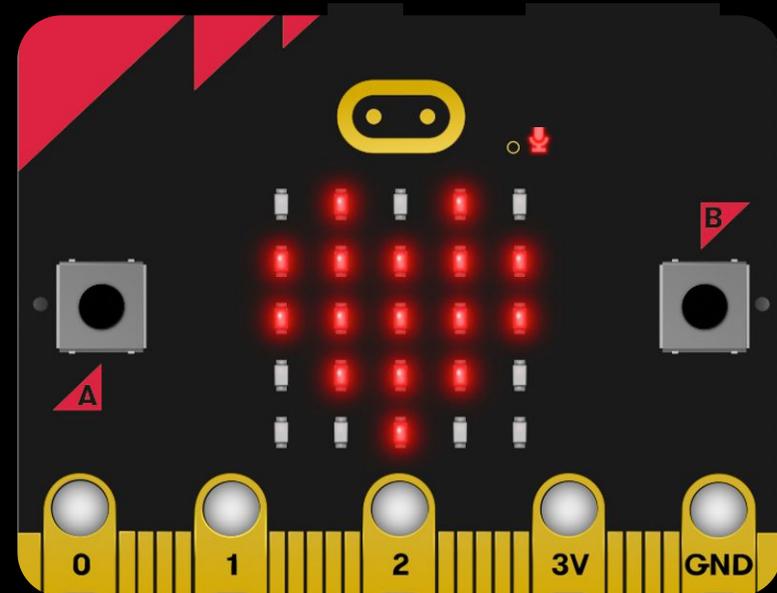
micro:bit



2020 - Ver 2



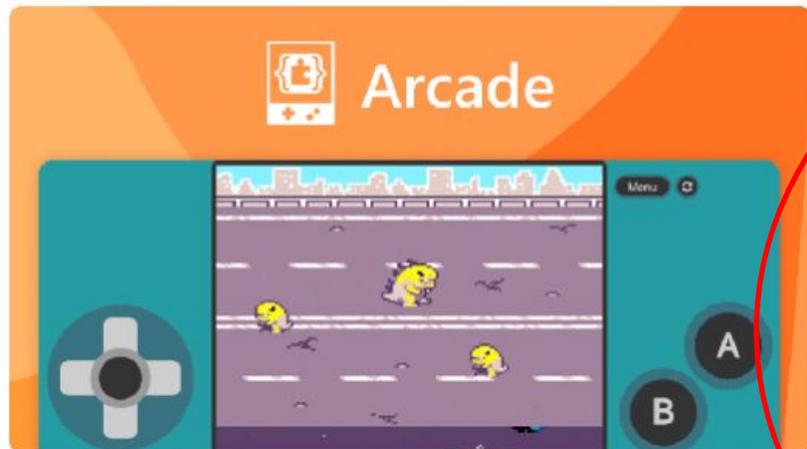
micro:bit



➔ makecode.com

Make & Code

Microsoft MakeCode is a free online learn-to-code platform where anyone can build games, code devices, and mod Minecraft!



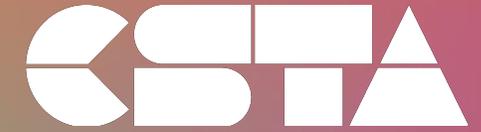
Make retro style Arcade games
100+ game mechanics ready to add to your game
[Start coding >](#) [Learn more >](#)



Write programs for the micro:bit
The pocket-sized computer that you could embed into any project - no hardware necessary
[Start coding >](#) [Learn more >](#)



Code mods for Minecraft
*Requires Minecraft: Education Edition
[Get access >](#) [Learn more >](#)



Open your Browser to...

makecode.microbit.org

Home Page

Microsoft | micro:bit

New? Start here!

Start Tutorial

My Projects [View All](#)

New Project

Import

Radio

18 days ago

Tutorials

New? Start Here!

Flashing Heart

Name Tag

Smiley Buttons

Dice

Love Meter

Micro C

Create a Project 🥰

Give your project a name.

CSTA

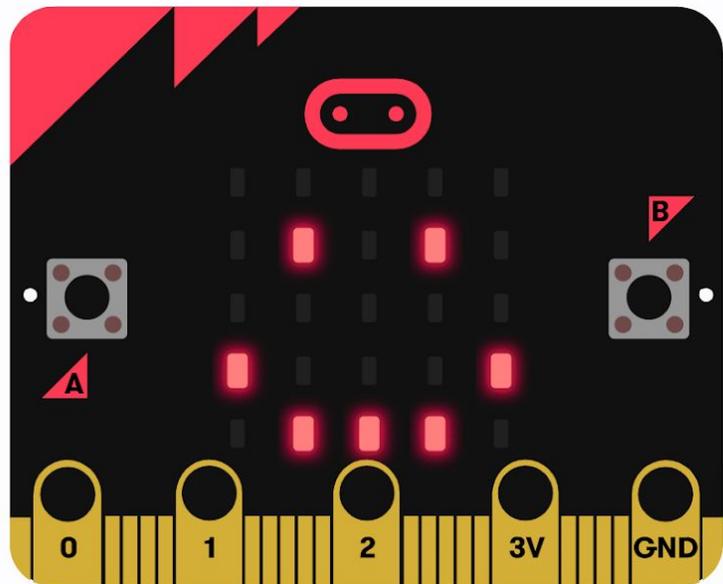
Code options

Create ✓

Import program files (.hex) or shared project URL's

Recent projects

Step-by-step Tutorials, Sample Projects, Curriculum, Videos



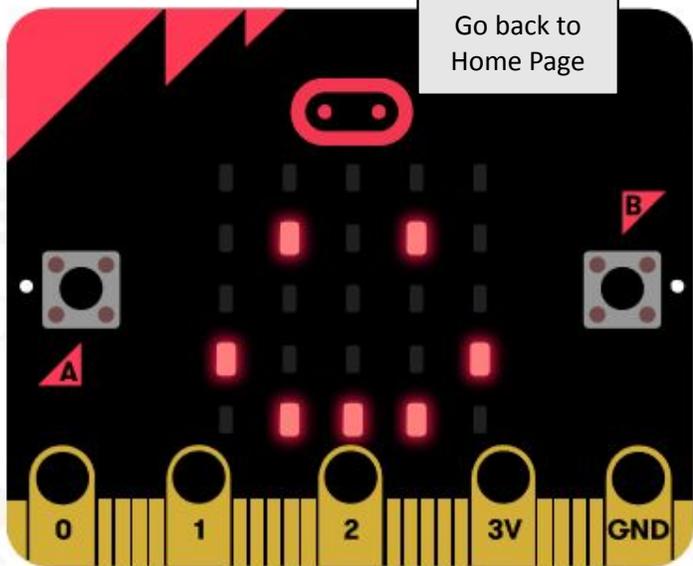
Simulator shows what your program will look like running on a micro:bit

- Search... 
-  Basic
 -  Input
 -  Music
 -  Led
 -  Radio
 -  Loops
 -  Logic
 -  Variables
 -  Math
 -  Advanced



Block **Toolbox**

Programming **Workspace** where you will build your program



Go back to Home Page



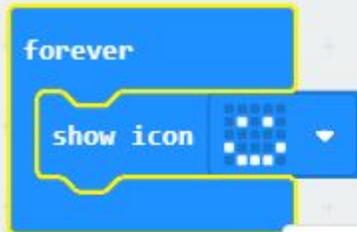
Simulator Toolbar

Simulator shows what your program will look like running on a micro:bit

Search...

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

Block Toolbox



Right-click on a block for Context Menu

- Duplicate
- Add Comment
- Delete Blocks
- Help

Programming Workspace where you will build your program

- Add Comment
- Delete All Blocks
- Format Code
- Snapshot

Right-click for Workspace Context Menu

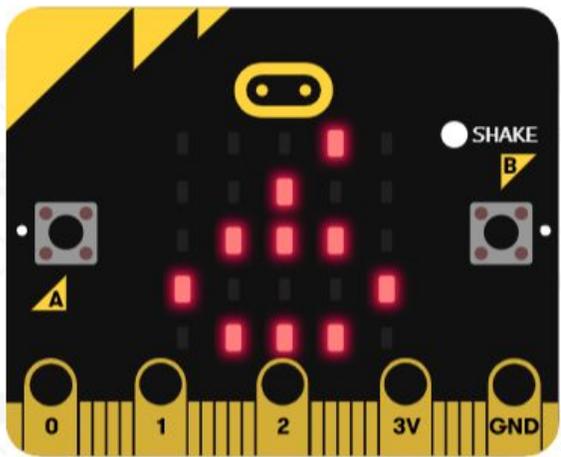
Undo/Redo and Zoom Workspace

Name your Project and Save it on your computer

Download

Smiley



Search... 

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

```
1 def on_button_pressed_a():
2     basic.show_icon(IconNames.HEART)
3     basic.show_leds("""
4         . . . . .
5         | | | | | . # . # .
6         . . # . .
7         . . # . .
8         . . . . .
9     """)
10 input.on_button_pressed(Button.A, on_button_pressed_a)
11
12 def on_button_pressed_b():
13     basic.show_number(min(42 / 7, 4 * 5))
14 input.on_button_pressed(Button.B, on_button_pressed_b)
15
16 def on_gesture_shake():
17     basic.show_string("April Fools!")
18 input.on_gesture(Gesture.SHAKE, on_gesture_shake)
19
```

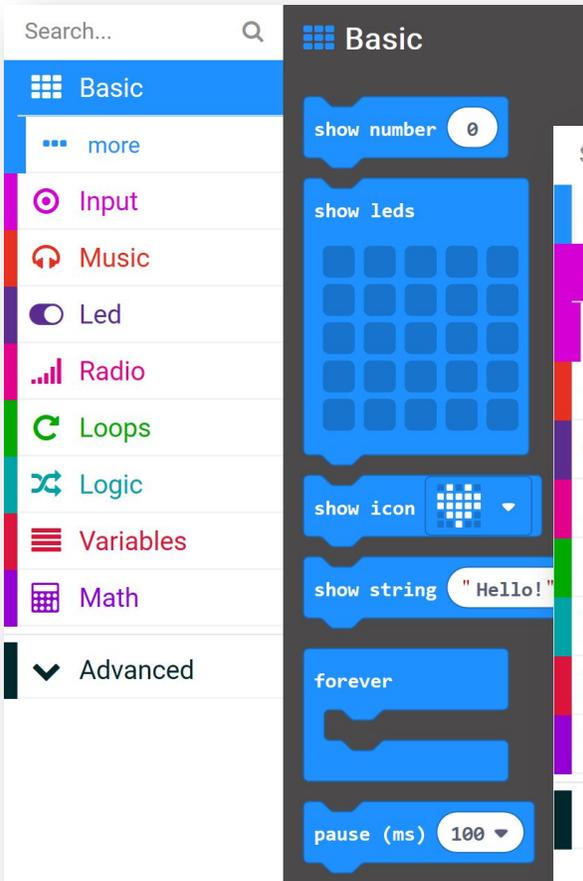
Download 

Basic

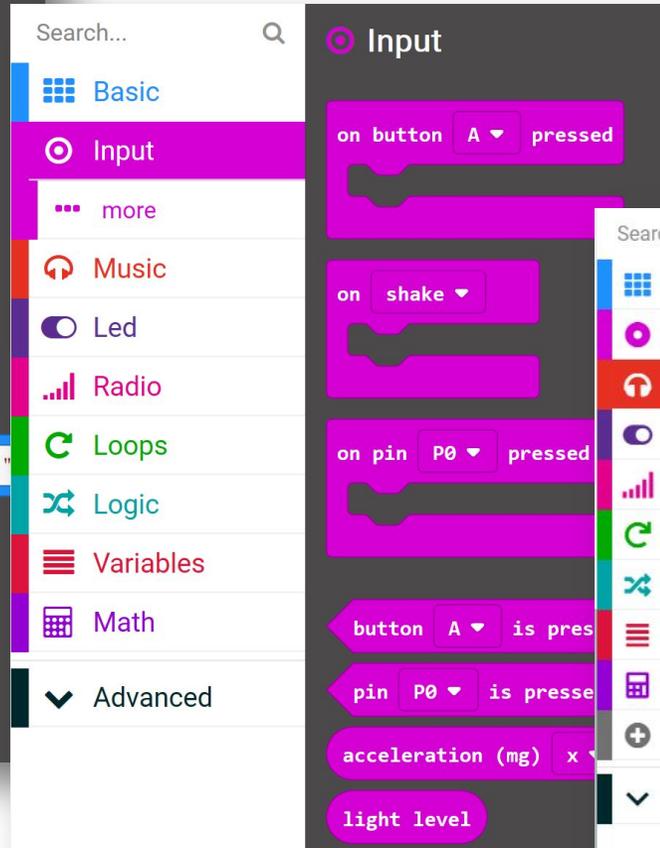


Code Blocks Introduction

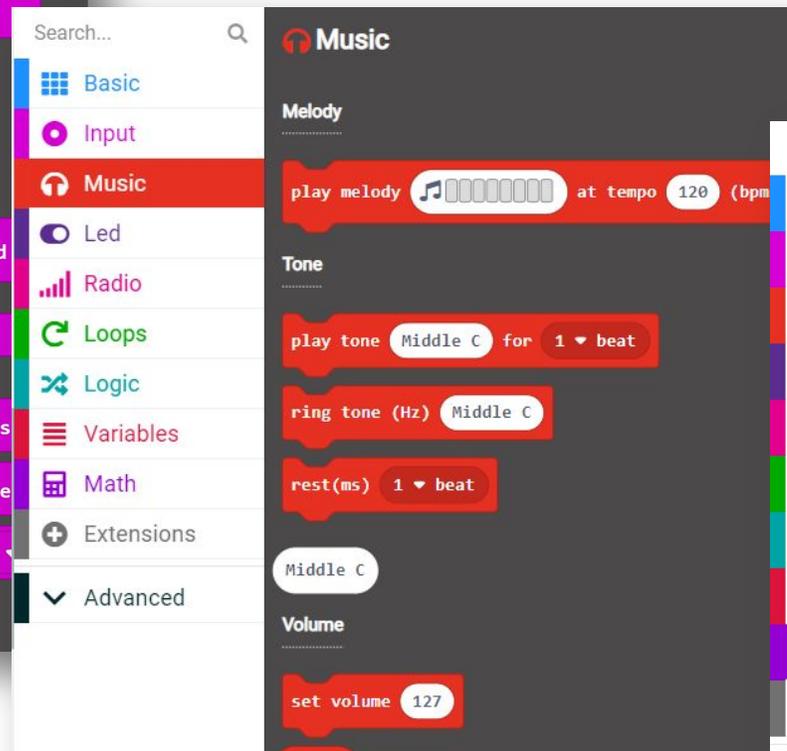
Basic



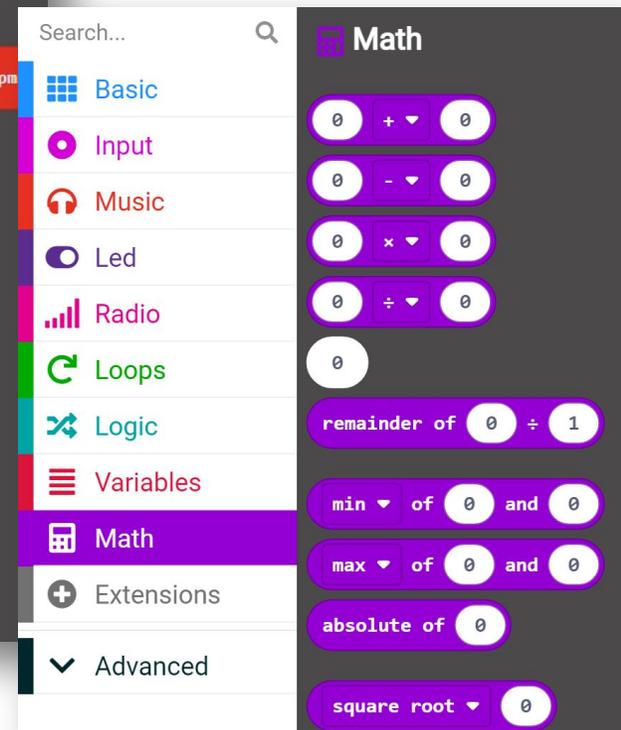
Input



Music



Math



```
on start
  show icon [grid icon]
```

```
on button A pressed
  show leds [5x5 grid with some lit]
```

```
on shake
  show string "CSTA"
  play melody [C4-D4-E4-F4-G4-A4-B4] at tempo 120 (bpm)
```

```
on logo pressed
  play sound [sine wave] until done
  show number pick random 0 to 10
```

Download your program to the micro:bit

The Yellow light on the back of your micro:bit will flash while your program is downloading

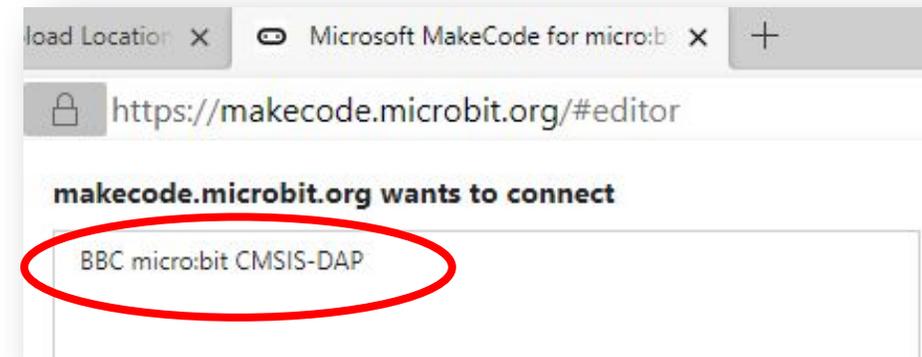
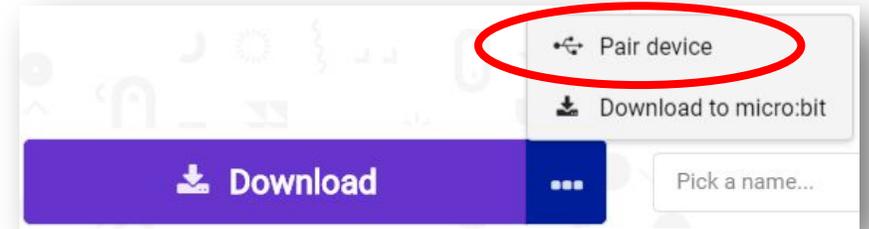


The micro:bit holds 1 program at a time, each time you download, you overwrite the previous program



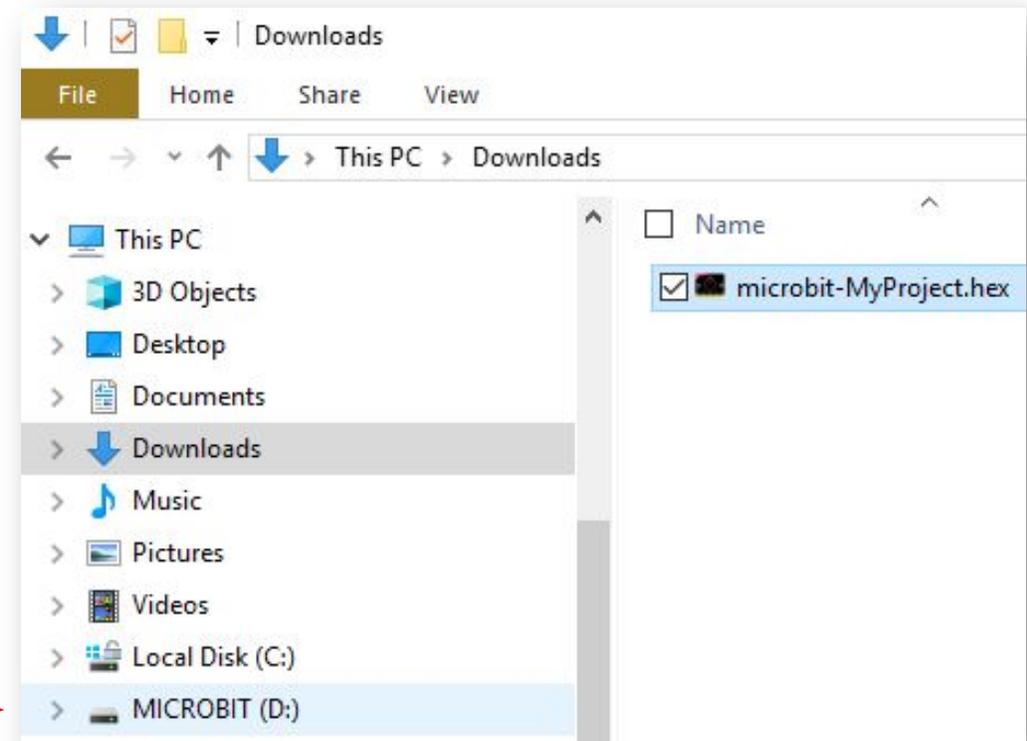
Web USB (Chrome or Edge only)

1. Plug in your micro:bit with USB cable
2. Click the 3 dots in the Download Button
3. Click Pair device
4. Click Pair device again 
5. Browser will prompt you to connect – select BBC micro:bit and click Connect
6. Download button should show USB icon
7. Click Download 



File Download to micro:bit

1. Plug in your micro:bit with USB cable
2. Click Download Button 
3. The microbit-.hex file will be downloaded into the **Downloads** folder of your computer
4. Copy and paste (or drag and drop) your file over to the micro:bit USB drive



Saving & Sharing Projects

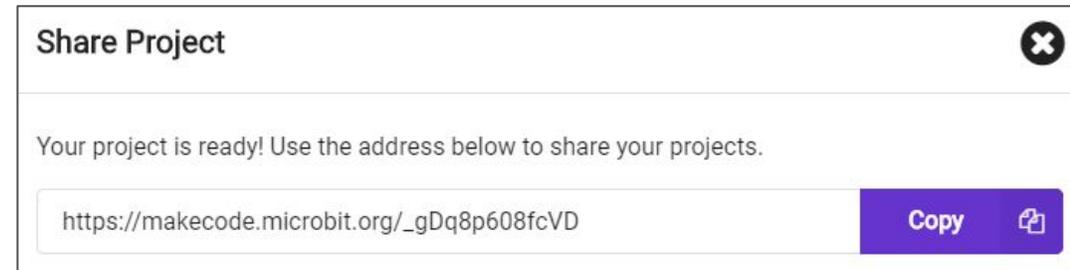
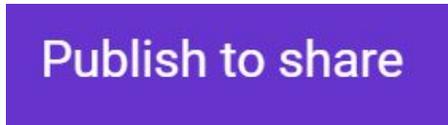
File:

- At the bottom on the screen, click on the **Save** button
- This will save your program as a file on your computer



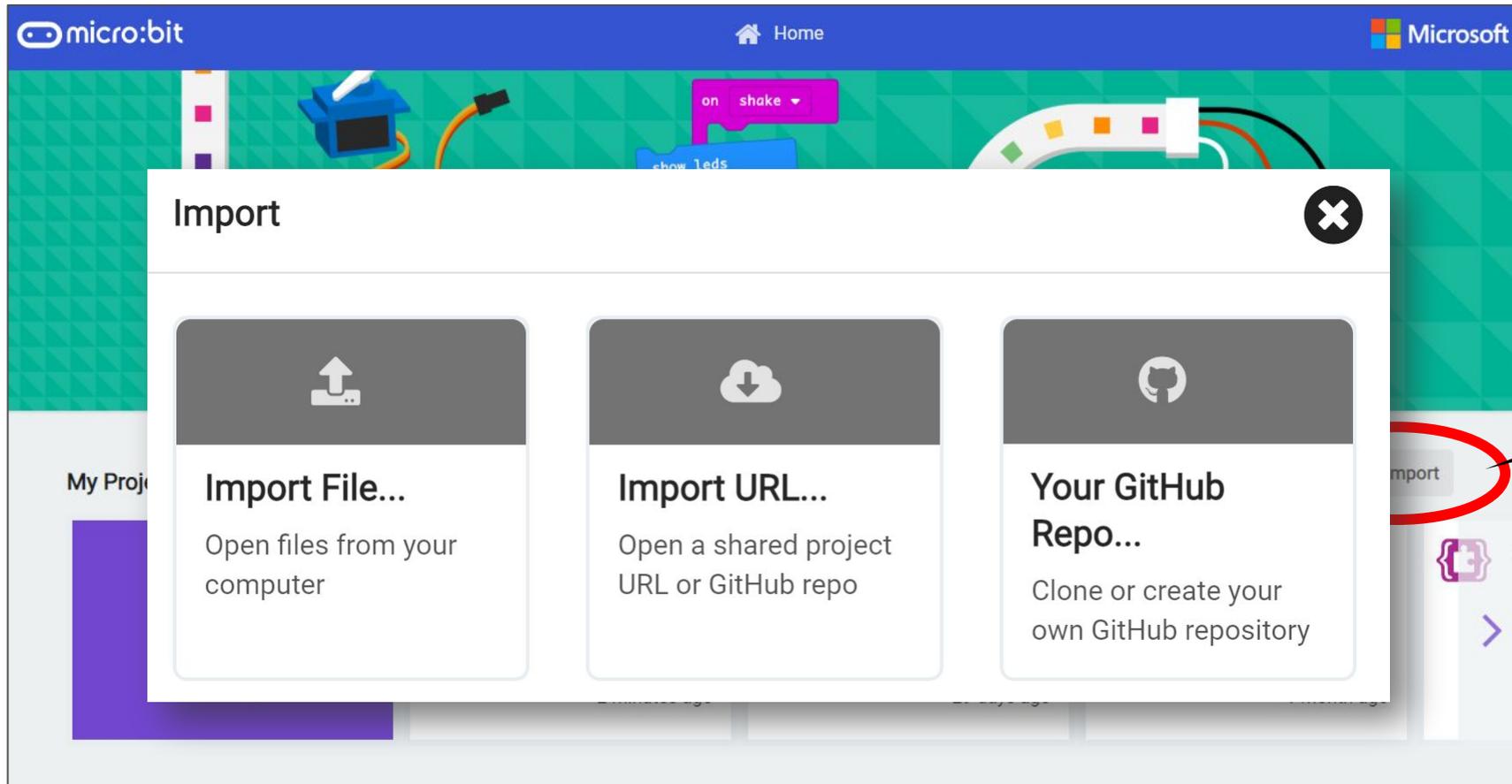
URL:

- At the top right of the screen, click on the **Share** icon
- Click **Publish**
- Click **Copy** to copy the URL to your clipboard



Importing Projects

At the top right of the screen, click on the **Home** icon



Click to Import Project files and shared URLs



**Let's Make & Code
Something!**

Digital Randomizer!

Make and Code a physical computing system that receives an input (**sensing**) and outputs a random value (**actuation**)

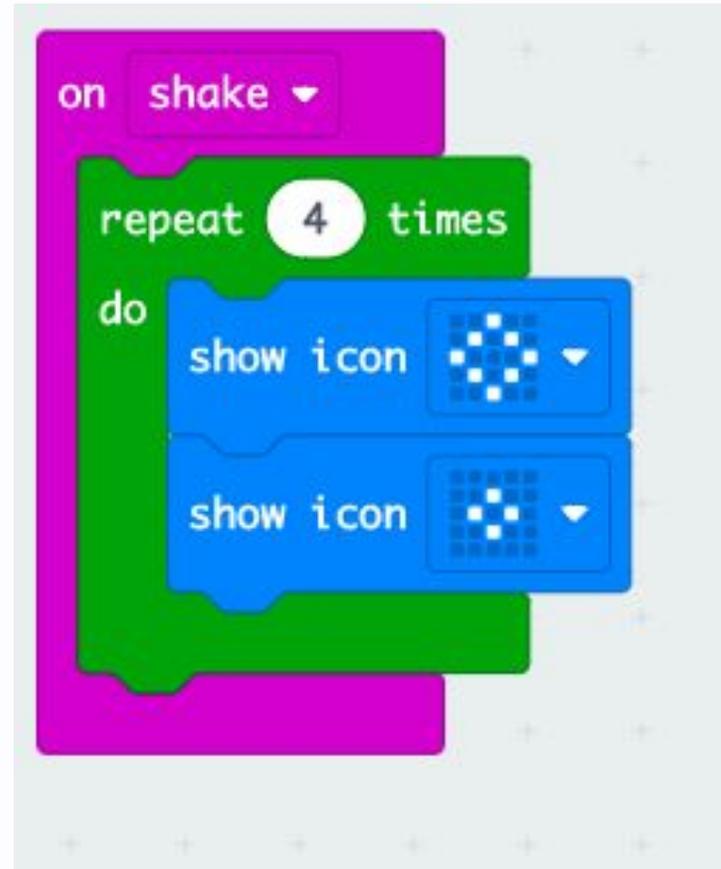
Examples:

- Dice
- Magic 8-ball
- Fortune Teller Machine
- Activity picker
- Weather forecaster
- Spin-the-wheel



Getting Started

Basic Dice Walkthrough...



```
on start
  set counter to 0
```

```
on shake
  repeat 4 times
  do
    show icon [die face]
    show icon [die face]
  set counter to pick random 1 to 6
  show number counter
```

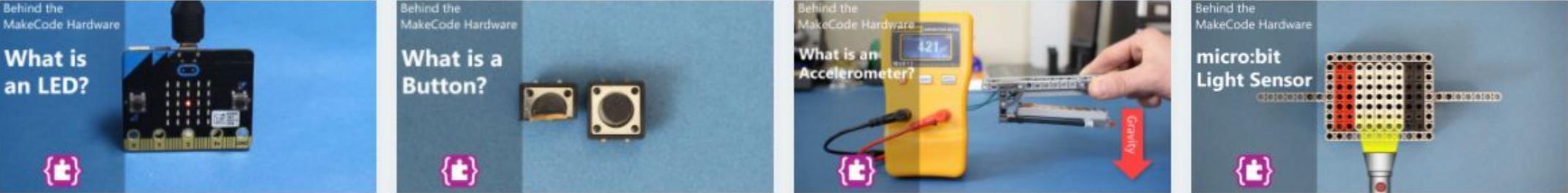
```
on logo pressed
  clear screen
```

Dice - https://makecode.microbit.org/_epxgutTcLTiT

Wheel - https://makecode.microbit.org/_YpcExF3r2aMd

Understanding the Hardware

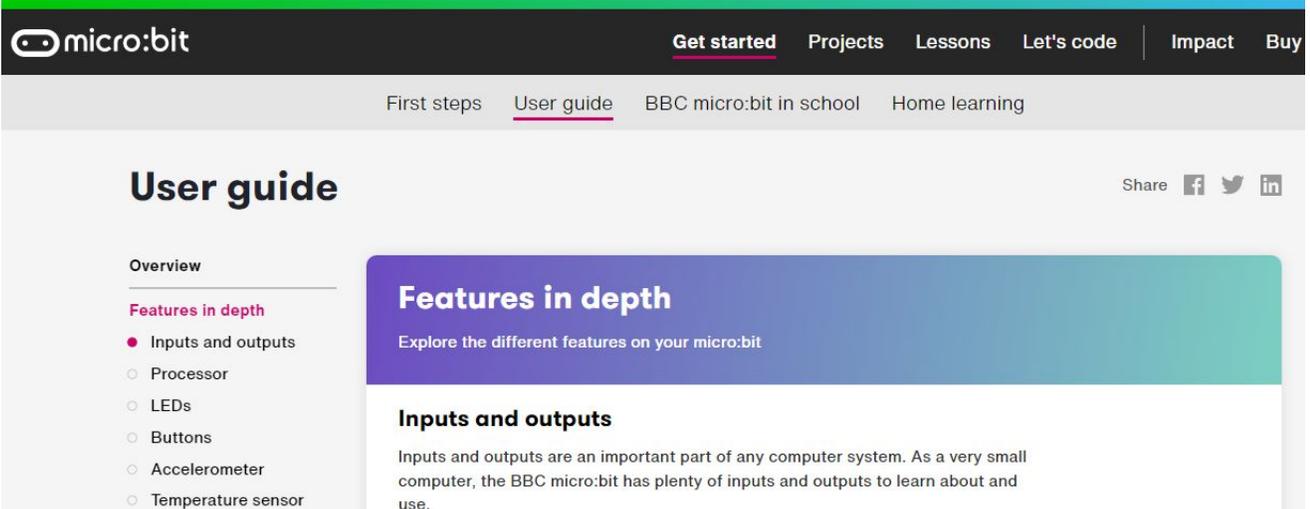
Behind the MakeCode Hardware



LEDs Buttons Accelerometer Light Sensor

makecode.microbit.org

microbit.org/guide/features



micro:bit [Get started](#) [Projects](#) [Lessons](#) [Let's code](#) [Impact](#) [Buy](#)

[First steps](#) [User guide](#) [BBC micro:bit in school](#) [Home learning](#)

User guide

Share [f](#) [t](#) [in](#)

- Overview
- Features in depth**
 - Inputs and outputs**
 - Processor
 - LEDs
 - Buttons
 - Accelerometer
 - Temperature sensor

Features in depth

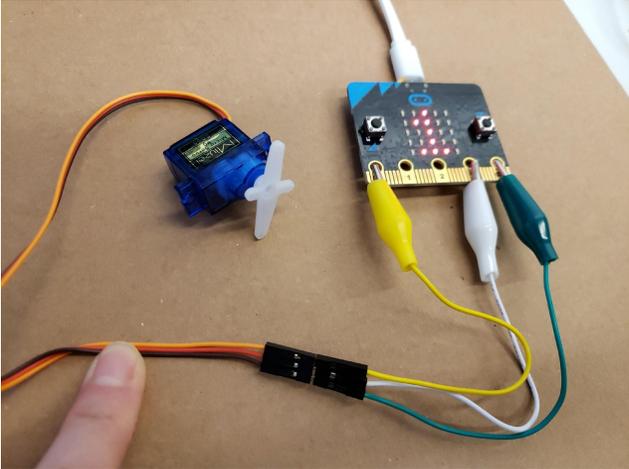
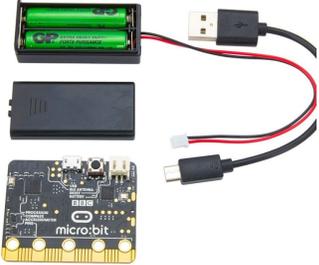
Explore the different features on your micro:bit

Inputs and outputs

Inputs and outputs are an important part of any computer system. As a very small computer, the BBC micro:bit has plenty of inputs and outputs to learn about and use.

Buying Micro:bit & Accessories

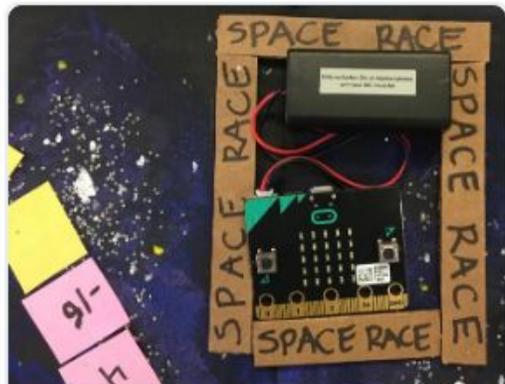
microbit.org/buy



Curriculum

makecode.microbit.org/courses

Free and open-source materials



Intro to CS Online

Online edition of the Intro to Computer Science course.

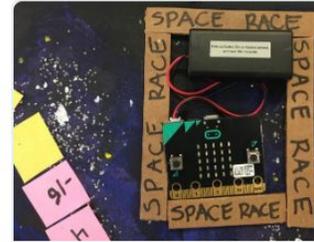


Intro to CS Classroom

Educator edition of the Intro to Computer Science course for the classroom, including complete downloadable materials.

Intro to Computer Science

MakeCode's course for learning Computer Science with the micro:bit. This is a 14 week computer science course for middle school grades 6-8.



Intro to CS Online

Online edition of the Intro to Computer Science course.



Intro to CS Classroom

Educator edition of the Intro to Computer Science course for the classroom, including complete downloadable materials.

Classroom

Courses contributed by educators to teach computing, science, and technology in the classroom.



Science Experiments

Science experiment lessons with measurements and data analysis activities.



Learn All About micro:bit

Projects and integration notes for a student-led workshop from the Beacon Hill School.



Coding and Innovation

An 8 week "Coding and Innovation using micro:bits" computer science course.

Computers and programming

Tutorials, lessons, and mini-courses about programming and computing.



Discover JavaScript Block



Networking with the micr



sparkfun



GROW YOUR OWN TEACHERS
ILLINOIS

Classroom Resources

microb

micro:bit

Get started Projects **Teach** Let's code Impact Buy News

For teachers Classroom resources Lessons Professional development

Classroom resources

Share

- Free downloads
- Student glossary
- Algorithm planning sheets
- LED planning grid
- Reward certificates
- Vocabulary labels
- Posters

micro:bit | classroom

Easily manage students' work when programming the BBC micro:bit

Free downloads

Resources to support your classroom teaching with the micro:bit including printable student hand-outs, reward certificates and wall display materials.

Resources and training for UK primary teachers

[Find out more](#)

Student glossary

Use this glossary to develop your students' knowledge of key computing vocabulary. Also available as a document that you can edit to suit your needs.

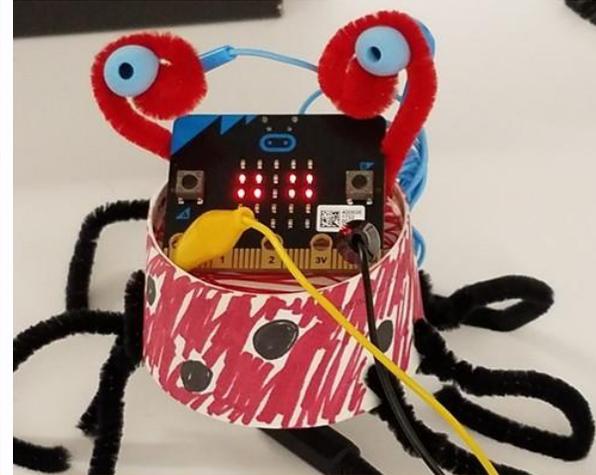
Student projects



WRIST CUFFS



SOIL MOISTURE



MICRO PETS



AIR GUITARS

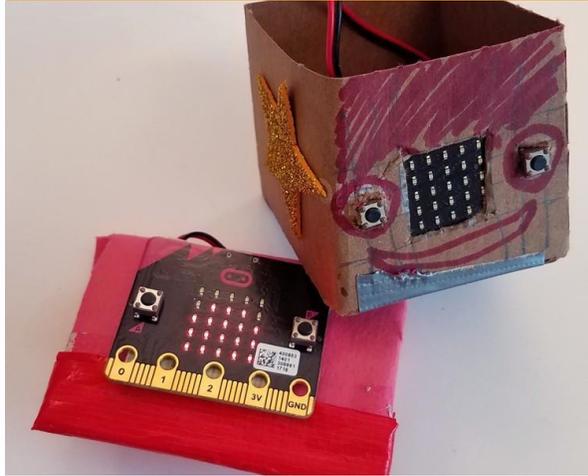
WALLET/PURSE



LIGHT MONSTERS



FIDGET CUBES



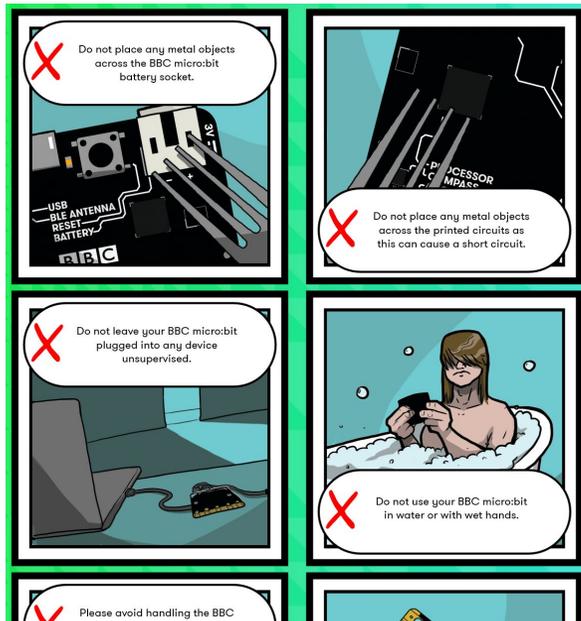
INCH WORM



Taking Care of your micro:bit

microbit.org/get-started/user-guide/safety

Student Safety Guide

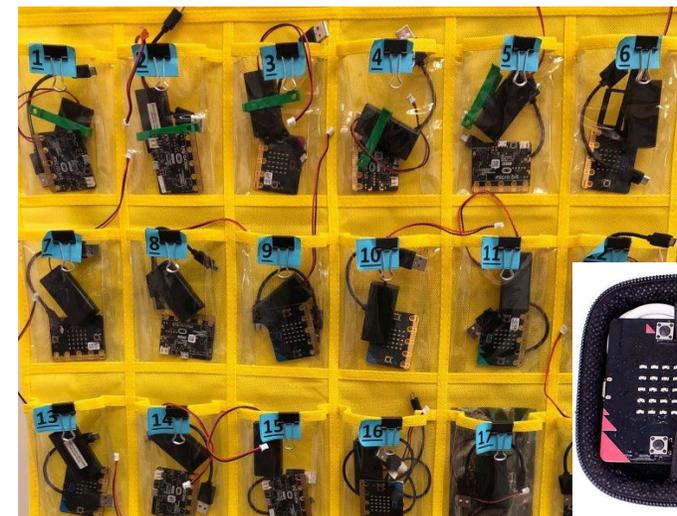
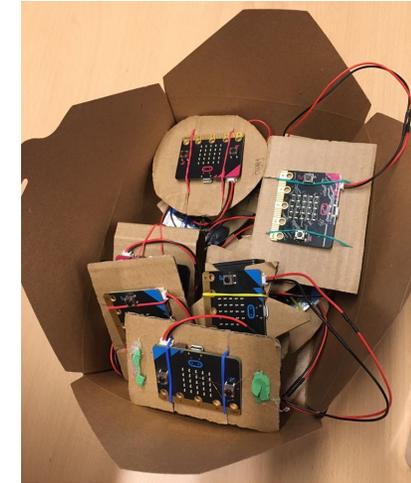


Safety Guide

Safety warnings

1. Always keep your BBC micro:bit in the anti-static bag when not in use. It's good practice for students to earth themselves before handling it.
2. Please handle your BBC micro:bit by its edges. This minimises the risk of damage through an electrostatic discharge.
3. Please use the battery pack and the USB lead provided to power your micro:bit. Do not use portable battery chargers or USB charging ports (often marked with a lightning bolt or 'SS'), to power your micro:bit. Using these may damage your micro:bit and stop it working properly.
4. Please do not attempt to keep using faulty micro:bits. If a school-issued micro:bit develops a fault, contact us at support@microbit.org immediately.
5. The maximum current safely supplied to an external circuit using the 3V pin on the edge connector is 100mA. Please make sure this limit is not exceeded.
6. Please do not store or use your BBC micro:bit in extremely hot or cold environments.
7. Do not place any metal objects across the printed circuits on the board as this can cause a short circuit damaging your BBC micro:bit. This can cause risk of burn or fire.
8. Do not use your BBC micro:bit in water or with wet hands.
9. Do not leave your BBC micro:bit plugged into a computer or any other device unsupervised.
10. Please avoid handling the BBC micro:bit circuit board while plugged into a power supply.
11. All peripherals (for example: USB cable, battery holder, sensors) used with your BBC micro:bit should comply with the relevant standards and should be marked accordingly.

Classroom Management Ideas





Terence Sullivan
tjsullivan2@eiu.edu



Slides