

MICROBIT OVERVIEW AND MAKECODE INTRODUCTION

(Time required 30-minutes session)

The micro:bit is a pocket-sized computer that lets you get creative with digital technology. You can code, customize and control your micro:bit from anywhere! You can use your micro:bit for all sorts of unique creations, from robots to musical instruments and more. The micro:bit is the most recent project by the British Broadcasting Corp. (BBC) in an effort to bring computer science education and STEM topics to every student in the United Kingdom. It is an open development board that works in sync with onboard hardware components to get you started down the path of programming hardware.

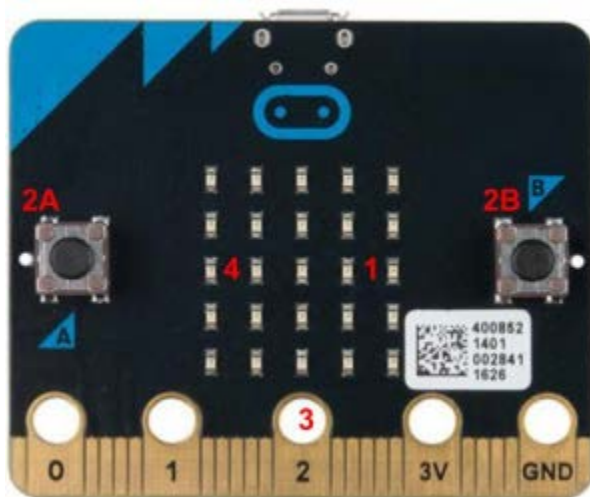


MicroBit components:

The micro:bit has a lot to offer when it comes to onboard inputs and outputs. In fact, there are so many things packed onto this little board that you would be hard-pressed to really need anything else if your goal is to explore the basics of programming and hardware.

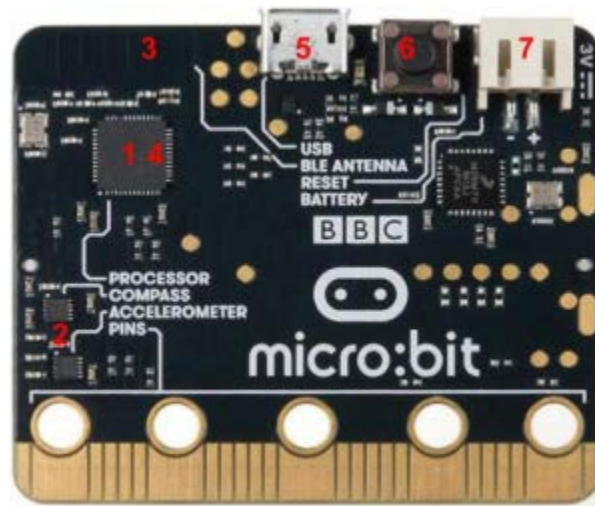
FRONT:

1. LED Array --- The micro:bit has a 5x5 LED array that you can use as a tiny screen to draw on and display words, numbers and other information.
2. A/B Buttons --- Two buttons in all of their clicky glory: A is on the left, B is on the right, and both are prime for controlling a game of your design.
3. Edge "Pins" --- The gold tabs at the bottom of the board are for hooking up external components. The tabs with larger holes can be easily used with alligator clips to prototype things quickly!
4. Light Sensor --- A bit of a hidden gem. The LED array doubles as a light sensor!



BACK:

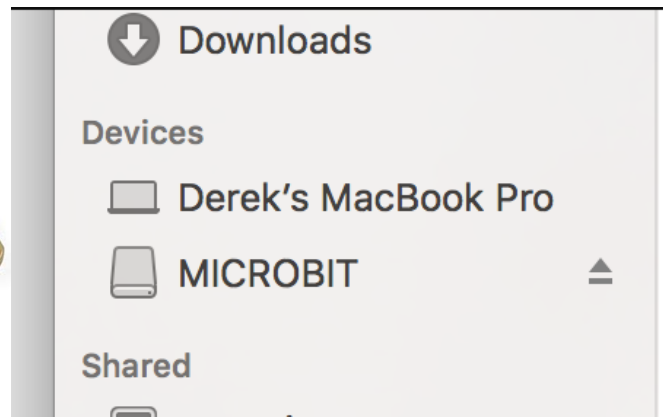
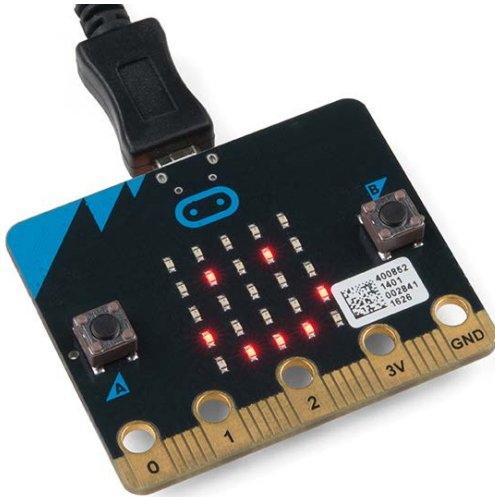
1. Microcontroller --- The brains of the outfit. The micro:bit is powered by a 16MHz ARM Cortex-M0 microcontroller with 256KB Flash and 16KB RAM.
2. Accelerometer/Compass --- The micro:bit has an onboard accelerometer that measures gravitational force, as well as a compass that can detect its orientation using Earth's magnetic field.
3. Bluetooth/Radio --- Communication is huge with the micro:bit. You can communicate with your phone or tablet using BLE or between two or more micro:bits using the standard "radio."
4. Temperature Sensor --- No, the drawing is not numbered incorrectly! The microcontroller doubles as a temperature sensor!
5. USB Port --- Used to upload code to your micro:bit or power from your computer or laptop.
6. Reset Button --- A button to reset your micro:bit and start your code over from the beginning.
7. JST Battery Connector --- A connector to hook up an external battery pack to your micro:bit.

**Connection:**

The micro:bit uses a microUSB cable to hook up to your computer or Chromebook. It is as simple as plugging the cable into your micro:bit and the other end into an open USB port. Once you plug your board in, you should see the small yellow LED on the back of your micro:bit light up and possibly blink a few times. Then whatever existing program that was put on the micro:bit will start running. If this is your first time plugging your micro:bit in, go ahead and play around with it a bit --- push buttons, shake it, and you will get a bit of an Easter egg.

Once your micro:bit boots up, check out your **Finder** if you are on a Mac, or your **My Computer Drives** if you are on a PC. The micro:bit should show up as an external storage device with two files stored in it.

If you are on a Chromebook, when you plug your micro:bit in you will be greeted with a dialog box to open the drive. Feel free to do so to make sure it works!



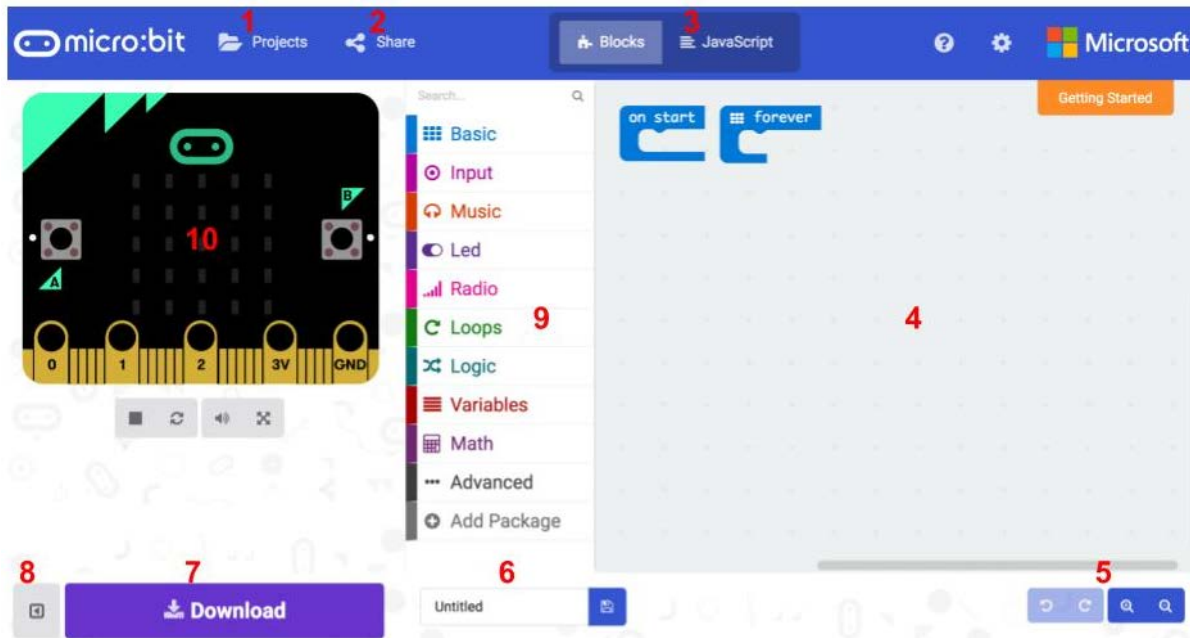
MakeCode Introduction

MakeCode is an open programming environment built by Microsoft for the micro:bit and other similar boards. To open the environment click on the link below.

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

MakeCode IDE overview

1. **Projects** --- A cloud storage system connected to your computer with no account setup required.
2. **Share** --- Allows you to share your project code in a number of different ways with your friends!
3. **Blocks/JavaScript** --- Choose your own adventure by programming in blocks (default) or in JavaScript.
4. **Program Space** --- This is where the magic happens and where you build your program...where you "make code."
5. **Zoom/Undo-Redo** --- Sometimes you need to undo things, or zoom out and look around; these are the buttons for that.
6. **Name & Save** --- Name your program and save it (download it) to your computer.
7. **Download** --- Similar to Save, download your program as a .hex file and drag it into your micro:bit.
8. **Block Library** --- All of the options in terms of program building blocks, which are color-coded by function.
9. **Simulator Hide/Show** --- You can hide/show the simulator if you would like.
10. **Simulator** --- You don't need hardware! MakeCode has a real-time simulator! As you change your program, you can see what it will do on this virtual micro:bit!

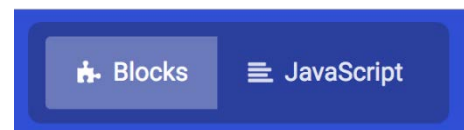
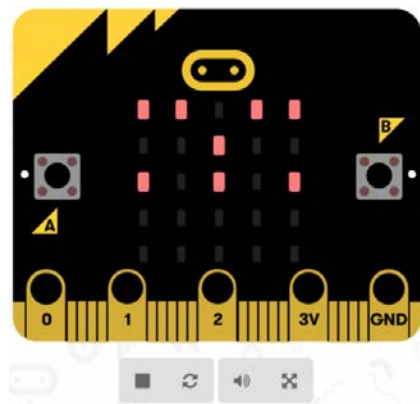


Block or Text Based Programming

We will be using Block-based programming in the majority of the activities. However, switching from block-based and JavaScript is very simple, and you may go back and forth. A nice IDE feature is that the same program will populate the other environment.

Simulator

MakeCode includes a simulator for the micro:bit, meaning if you do not have your micro:bit in hand you can still write code for it. Or if you want to try out an idea before you upload it to your micro:bit, you can do that too!



Congratulations! You have successfully completed this activity.

Reference: Sparkfun Inventor's Kit for micro:bit Experiment Guide

<https://learn.sparkfun.com/tutorials/sparkfun-inventors-kit-for-microbit-experiment-guide>