

Lesson Name: Intro to Microbits

Suggested Age / Grade Level	Curriculum Covered	Duration
Any Age	Fundamentals of Computer Programming	1 – 2 hours

Overview

Microbits are tiny computer systems that can be programmed to act in any way we want. This is a great way to teach the basics of computer programming to people who have had no experience whatsoever with computers. Going over the basics can prepare them to understand other programming languages with relative ease.

Learning goals

- What is a Microbit and what it can do
- The anatomy of a Microbit
- The types of loops used
- Boolean operators (AND, OR)

Background Information

- Microbit.org (where we will be programming the Microbit)

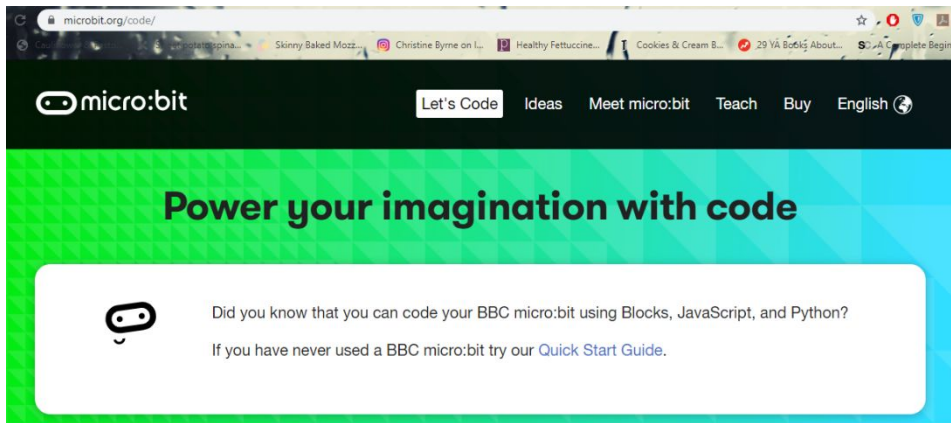
Materials

- A functioning computer
- Strong internet connection
- Projector

Procedure

NOTE: It is very useful to go through the procedure on a computer on a projector so the kids can follow along. This saves time going around from computer to computer to make sure everyone is on the same page. As you do each step, explain what the functions are and why they are important to the code (this is especially important for younger children).

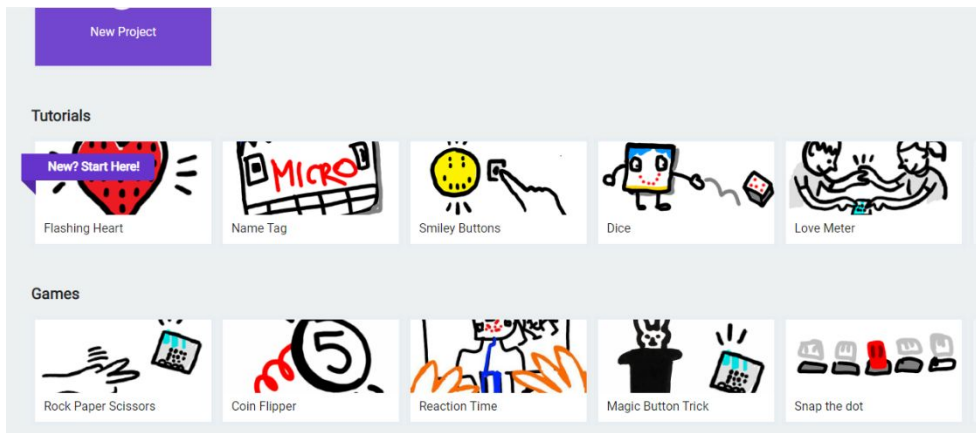
1) Go online to <https://www.microbit.org/> and click on “Let’s Code”



2) Scroll down and click on the MakeCode editor

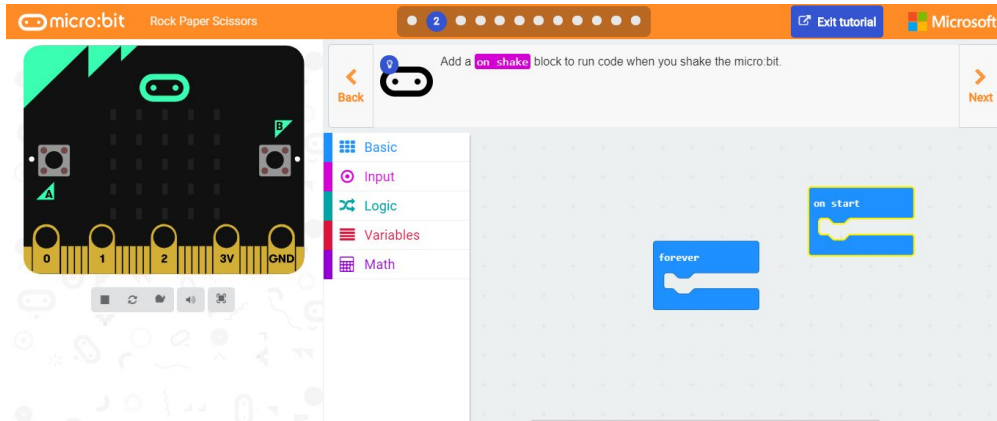


3) Once you enter that page, you'll see a variety of microbit projects that you can do but for this lesson, we will be doing a rock paper scissors game. Scroll down and click on it when you see it

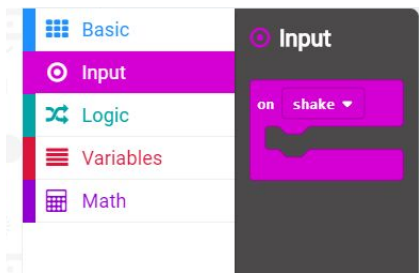


4) On your right is the makecode editor where you'll be writing your microbit program using blocks; you already see some blocks in the editor right now, if they are not important, you can drag and drop it to your left to get rid of them. On your left is a microbit representation where you can test your code out before

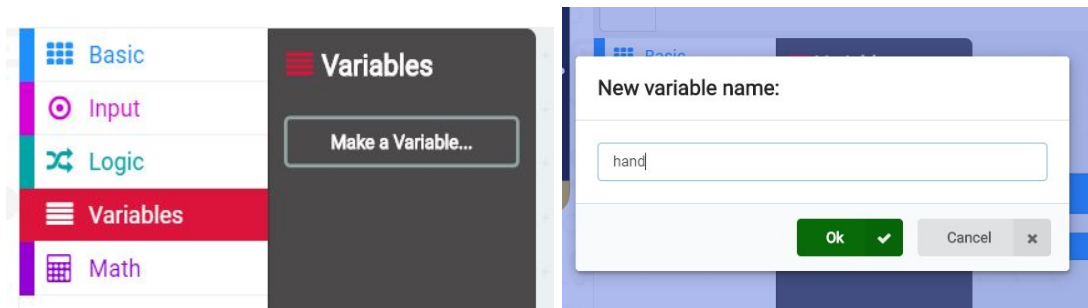
transferring it to your microbit



- 5) We start by opening the “Input” menu and dragging the shake block to the editor. This means the microbit will do something when it will be shaken

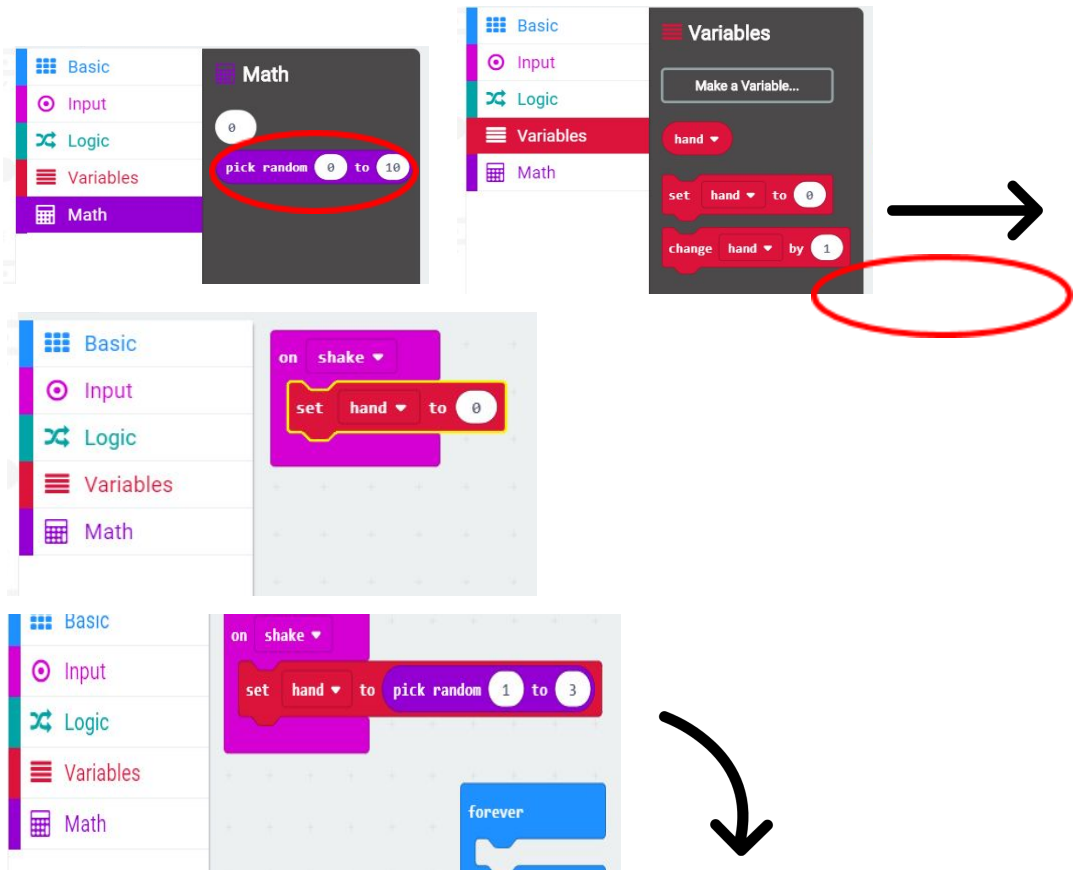


- 6) Before we display any pictures, we set aside a variable. That variable (let’s call it “hand”) that will display exactly that. Click on “Variables” then “Make a Variable”.

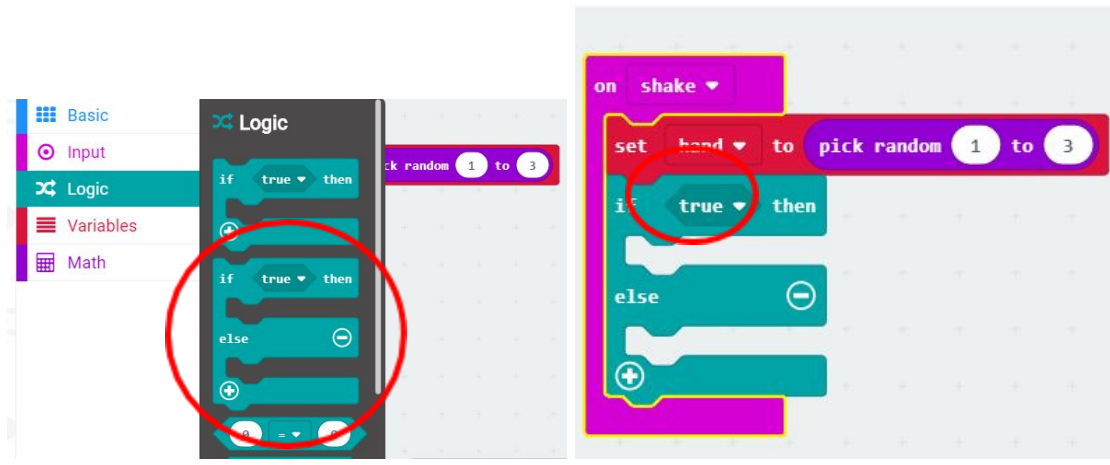


- 7) Now that we have our variable, our microbit will pick any one out of the three outcomes (rock, paper, scissors). For that, we go to “Variables” and drag “Set hand to” block under “Shake”. Since there are 3 outcomes and the microbit will pick them entirely out of random, we will go to “Math” and choose the “pick random” block. Make sure to enter numbers 1 and 3 there.

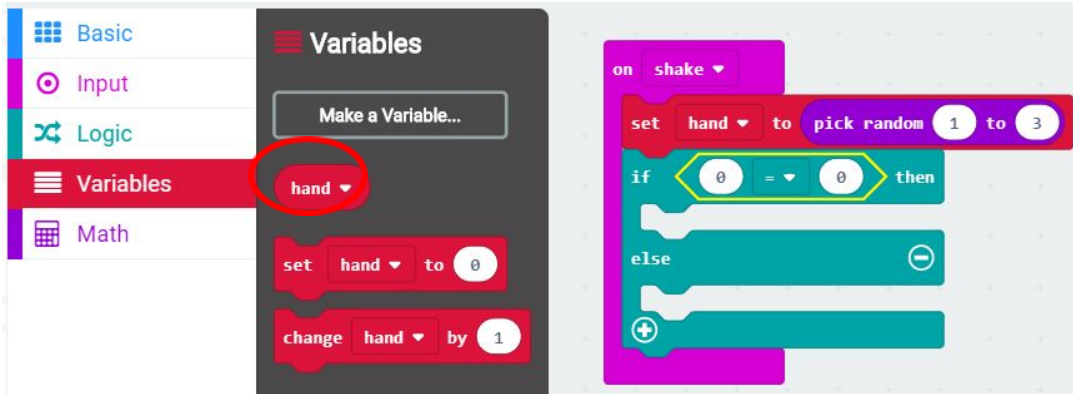




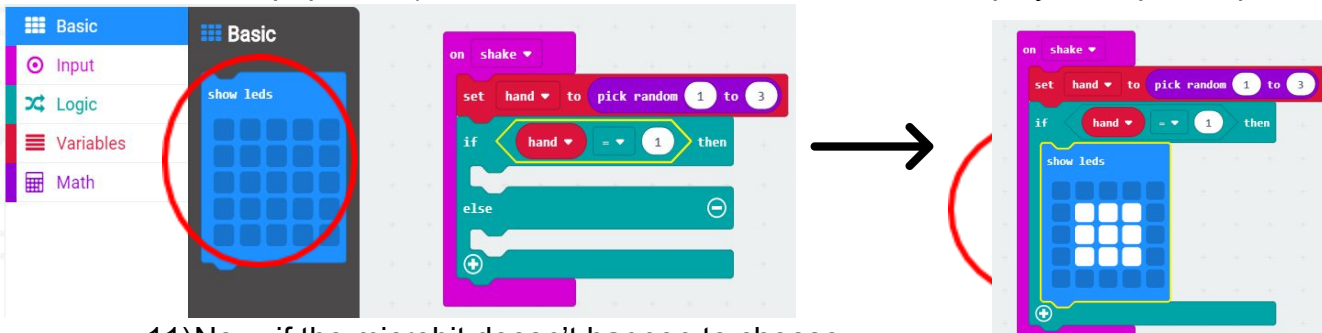
8) We have 3 outcomes but what the microbit doesn't know is what it should do when it picks any of those numbers. We will create a **Loop**; it will display a picture of a rock, a paper or scissors (not necessarily in that order) when it picks 1, 2 or 3. We will be using an **if** loop because the result (picture) is entirely dependent on what number the microbit will choose. Go to "Logic" and drag the 2nd block to the editor (make sure it still remains under the "shake" block). Since we will be comparing the "hand" variable to the number of outcomes, drag the last block and drop it in place of the "true" slot in the if block.



9) Since we will be comparing the “hand” variable to the number of outcomes, go to “Variables” menu and drag the “hand” variable and drop it in the first spot of if



10) In the last spot of if, type “1”. Go to the “Basic” menu and drag the “show leds” in the space between “if” and “else”. Create a picture of a rock, paper or scissor (we drew paper first). When the microbit chooses 1, it will display that specific picture.



11) Now, if the microbit doesn't happen to choose number 1, what would happen? We would click on the plus sign under the else line to extend the if block, because there are 3 random outcomes, which is why we are extending the if block



```

on shake
  set hand to pick random 1 to 3
  if 0 = 0 then
  else
  
```

```

show leds
else if then
else
  
```

12) Repeat of steps 8 to 10 for the remaining scissors and rock in the “show leds” block. Make sure to compare the right variables with the right outcomes

```

else if hand = 2 then
  show leds
else
  show leds
  
```

13) Now your code is ready. Download the code and transfer it to your microbit. Now your ready to play Rock, Paper, Scissors with your microbit!

GAME APPLICATIONS:

Once the children have played the game a few times, a few modifications can be made to the code to create a boggle type game as follows:

- Change the rock, paper, and scissors icons in the “show LED” boxes to letters
- Feel free to add additional boxes by repeating steps 8-10 for however many LED letters you want each microbit to have (depending on the class size 3-6 letters per microbit)
- Have the kids get into groups of 4 microbits all with different letters programmed
- **MAKE SURE THE MICROBITS HAVE AT LEAST A FEW VOWELS PROGRAMMED ON THEM**
- Have the kids shake their microbits in their groups and see how many words they can make out of their 4 letters
- Have them write down all their words and whichever group can make the most words wins!

Instructor: Keep score of the groups, have the kids name their groups creative names and keep score of how many words each group spelled on the black/white boards. Time pending, do a few rounds (depending on the time left in the session) and see which group wins.