# Micro:bit

Can you outsmart a computer? Write code for a micro:bit as a software engineer. Then, it's you versus the micro:bit in a high stakes game of Rock Paper Scissors!

## TEKS:

TECH K-2.1 C: The student is expected to explore virtual environments, simulations, models, and programming languages to enhance learning.

TECH K-2.6 A: The student is expected to use appropriate terminology regarding basic hardware, software applications, programs, networking, virtual environments, and emerging technologies.

TECH 6.6 A: The student is expected to define and use current technology terminology appropriately.

TECH 8.6 N: The student is expected to integrate two or more technology tools to create a new digital product.

## Materials:

- 2 AAA batteries
- Computer with USB port, tablet, or smartphone
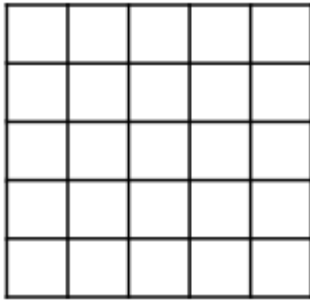- Micro:bit with battery pack

## How To:

Before you code your Rock Paper Scissors game (instructions below), take some time to get to know your micro:bit! Add the battery pack, plug the micro:bit into your computer (or pair it with a tablet or smartphone), and go to makecode.microbit.org.

1. Design a micro:bit display to represent a rock, paper, and scissors. Sketch out what you want these to look like using the three 5x5 grids below. Shade each square that you want to light up on the micro:bit display when rock, paper, or scissors are played.
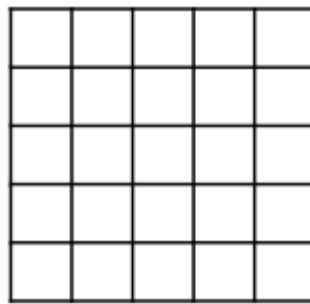
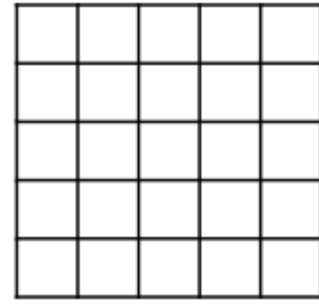|     |     |     |     |     |
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Rock

Paper

Scissors

2. Click the blue "Home" button at the top of your computer screen and scroll down to the section called "Games."

3. Click on "Rock Paper Scissors" and press the purple "Start Tutorial" button. Follow the instructions below (or on your screen) to create the game!

4. Drag and drop the "on shake" block into your code.

5. Create a variable! Click on the red "Variables" section and choose "Make a Variable." Call this variable "hand" and press "Ok."

6. Drag the red "set hand to" block into the pink "on shake" block.

7. Click on the purple "Math" tab and drag the purple "pick random" block into the white "0" oval of the red "set hand to" block. Change the "Pick random 0 to 10" to "Pick random 1 to 3." For this game, you will need your micro:bit to randomly pick either rock, paper, or scissors… only three different options!

8. Click on the teal "Logic" tab and drag the first teal "if true then" block beneath the red "set hand to" block inside the pink "on shake" block.

9. Find the "0=0" block in the teal "Logic" tab and drag it into the "true" part of the teal "if true then" block.

10. Click on the red "Variables" tab. Drag the "hand" block into the first "0" and change the second "0" to be equal to 1.

11. Open the blue "Basic" tab and add the "show leds" blocks into the middle of the teal "if hand = 1 then" block.

12. Transfer your design for paper onto this LED grid by clicking on the corresponding boxes!

13. Click on the small "+" button at the bottom right corner of the teal "if hand = 1 then" block. This will add an "else" section to the block.
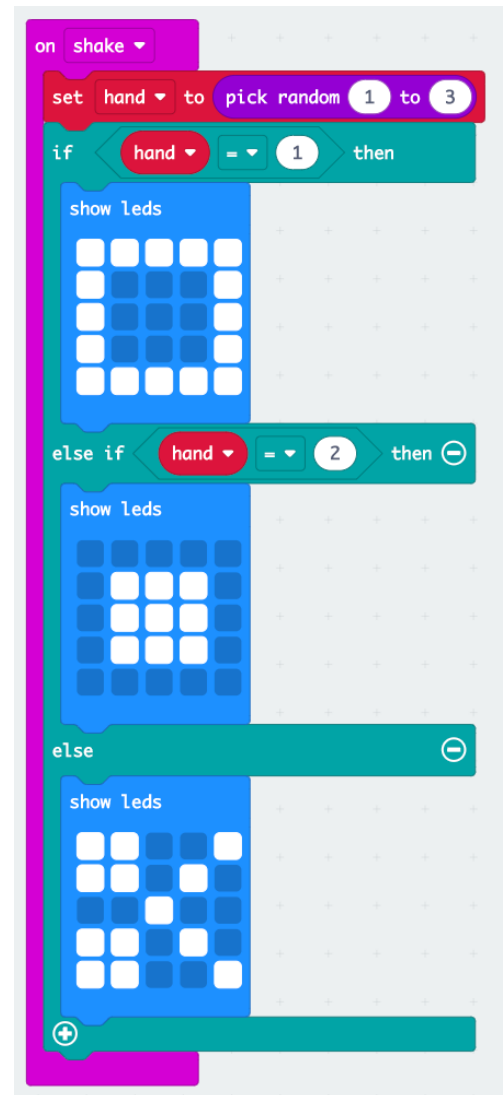
## 31 Days of STEM Fun!

14. Open the blue "Basic" tab and add a "show leds" block into the "else" section. Transfer your design for scissors into this LED grid!
15. Click on the small "+" button at the bottom right corner again. This will add an "else if" section.
16. Find the "0=0" block in the teal "Logic" tab and drag it into the empty shape after "else if."
17. Click on the red "Variables" tab. Drag the "hand" block into the first "0" and change the second "0" to be equal to 2.
18. Open the blue "Basic" tab and add a "show leds" block into the "else if" section. Transfer your design for rock into this LED grid!
19. Your game is ready to play! Shake the micro:bit and it will randomly display either rock, paper, or scissors.

## STEM Explanation:

Today you programmed a game on a very small computer called a micro:bit. You created a computer program! A computer program is a set of specific instructions that a computer follows to complete a task. Computers cannot make these instructions on their own, so humans have to create the instructions for them. These instructions are called programs or code. Cell phones, computers, and video games all use computer programs to run, and so do things like cars, microwaves, home thermostats, and even washing machines! That means that all of these devices have computers inside them, from the small computers inside smartwatches to the large computers inside of a self-checkout machine at a grocery store.

How did you program the micro:bit computer to display either rock, paper, or scissors? You used conditional statements! Conditional statements tell a program to do an action depending on whether a specific condition is met. Conditional statements are also called "if, then" statements, telling a computer "if a certain condition is true, then do something." The teal "if, then" programming block told your micro:bit some very important information! First, you set this condition for the micro:bit: if the random number the computer generates is 1, then it should show the paper LED display. You then set a second condition using the "else if" block: if the random number the computer generates is not 1 but is 2, then it should show the rock LED display. Finally, you set a third condition for the micro:bit using the "else" block: if the random number the computer generates is not 1 or 2, then it should show the scissors LED display. Coding the micro:bit with those three conditional statements allowed it to play Rock Paper Scissors!

## Career Connection:

*Software engineers* design and modify computer programs. They create mobile apps, web applications, games, robots, and even entire network systems! The programs software engineers create must be dependable, easy to understand, useful, and efficient.

## Resources:

https://makecode.microbit.org/
https://www.claricode.com/content/Software-Programming-And-Coding-For-Kids.aspx