

Strawbees.®

**ROBOTIC  
INVENTIONS**  
for the **micro:bit**

# ONBOARDING



For courses, curriculum-aligned lessons, and other fun resources:

[classroom.strawbees.com](https://classroom.strawbees.com)

# WELCOME TO ROBOTIC INVENTIONS ONBOARDING

## You will learn how to:

- Assemble the Strawbees Robotics Board for the micro:bit.
- Use a battery to power the micro:bit.
- Use motors with the Robotics Board and the micro:bit.
- Connect the micro:bit to Strawbees structures.
- Installing and Getting Started with the Strawbees MakeCode extension.
- Use the micro:bit Coding cards.

## You will need:



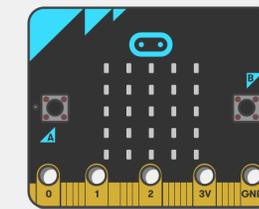
Internet connection



A computer with MacOS 10.6 or Windows 7 or newer, or a smart phone or tablet



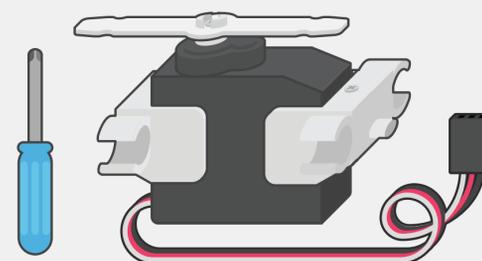
Robotics Board  
for micro:bit



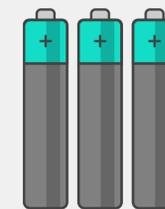
BBC micro:bit



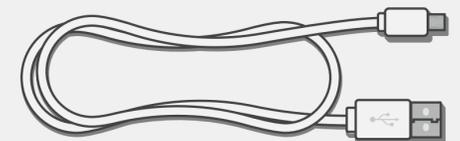
micro:bit Clip



Servo motor, arm, mount  
and screwdriver



3 x AAA Batteries



USB cable

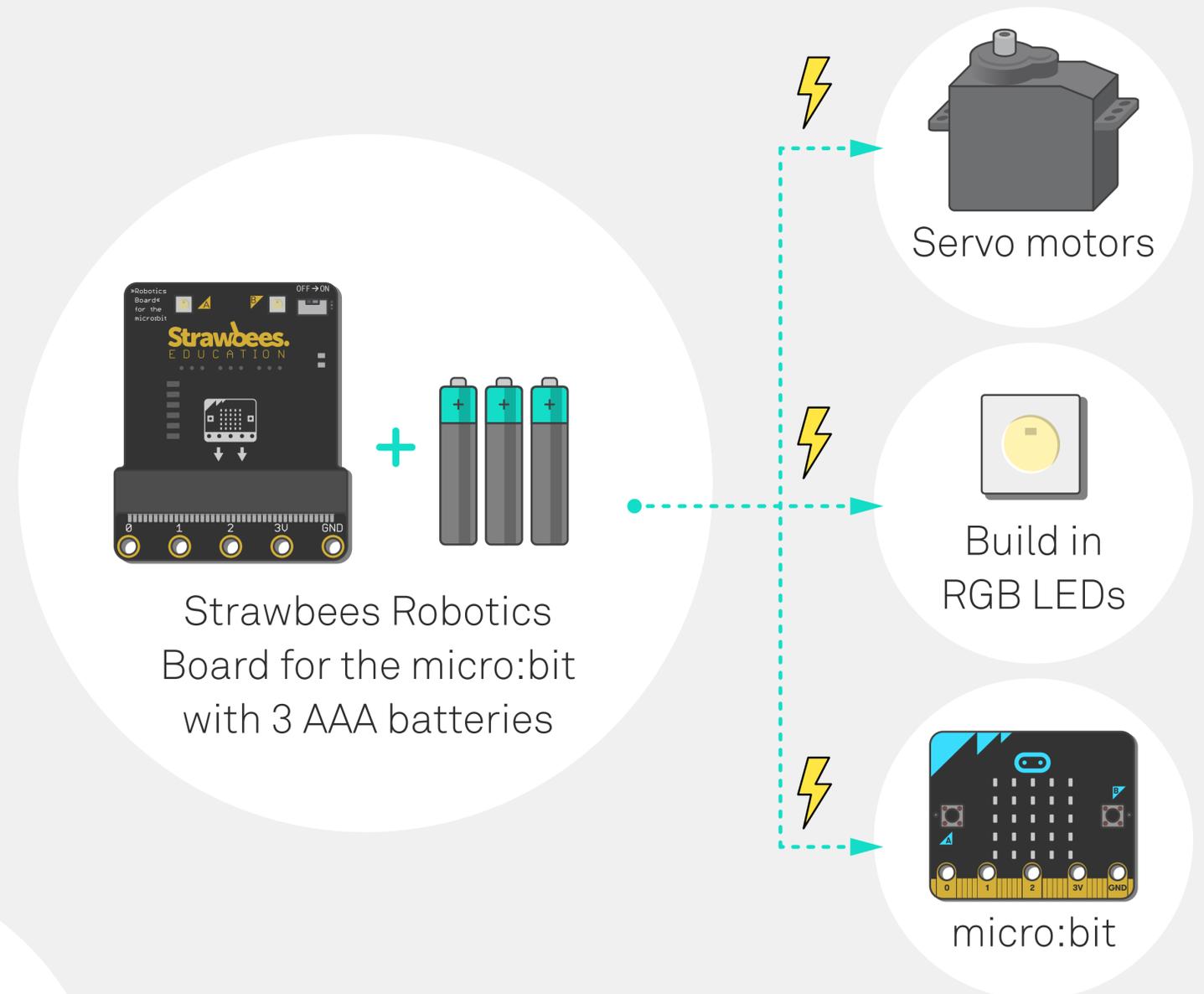
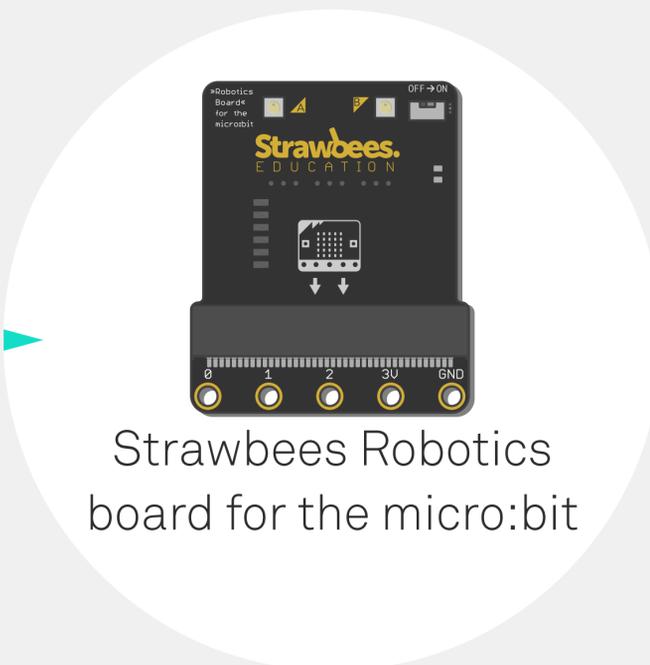
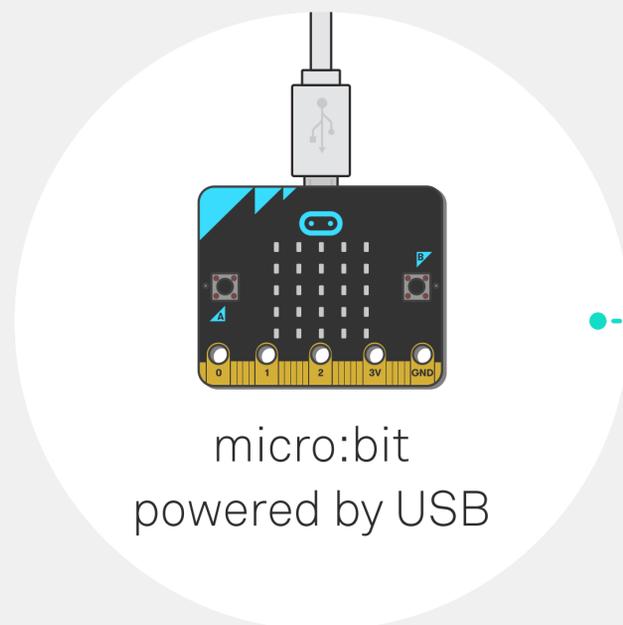
# BATTERIES AND POWER

The Robotics board runs on 3 AAA batteries

The batteries power:

- Connected Servo Motors
- Built-in RGB LEDs
- The micro:bit board

The Robotics Board gives power to the micro:bit, but the micro:bit does NOT give power to the Robotics board.



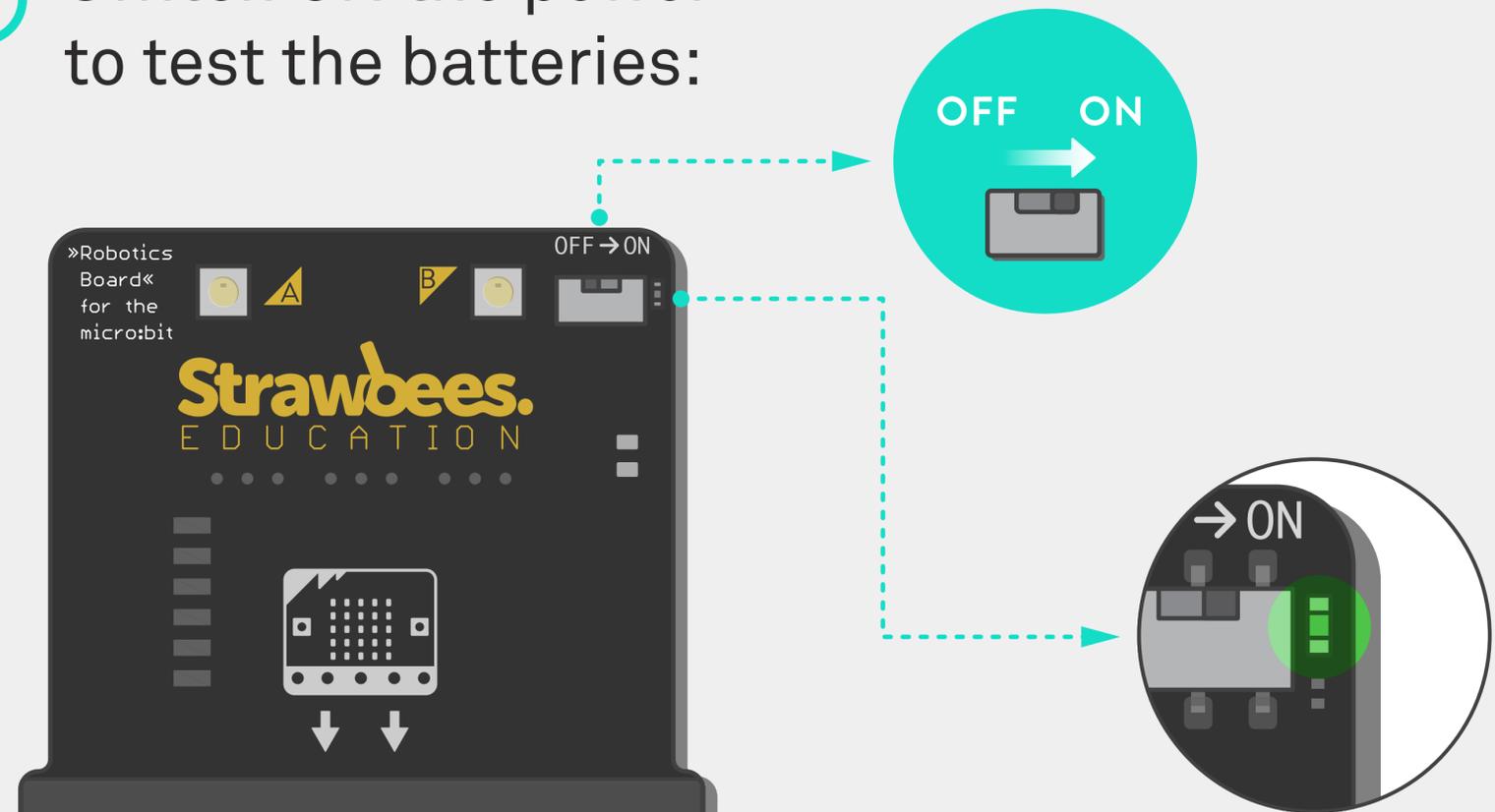
This means that if you power the micro:bit from the USB cable that will not automatically give the motors power. The motors always need the Robotics Board have batteries and the power switch to ON to work.

# INSERT BATTERIES AND POWER ON

- 1 Insert the batteries like this:



- 2 Switch ON the power to test the batteries:

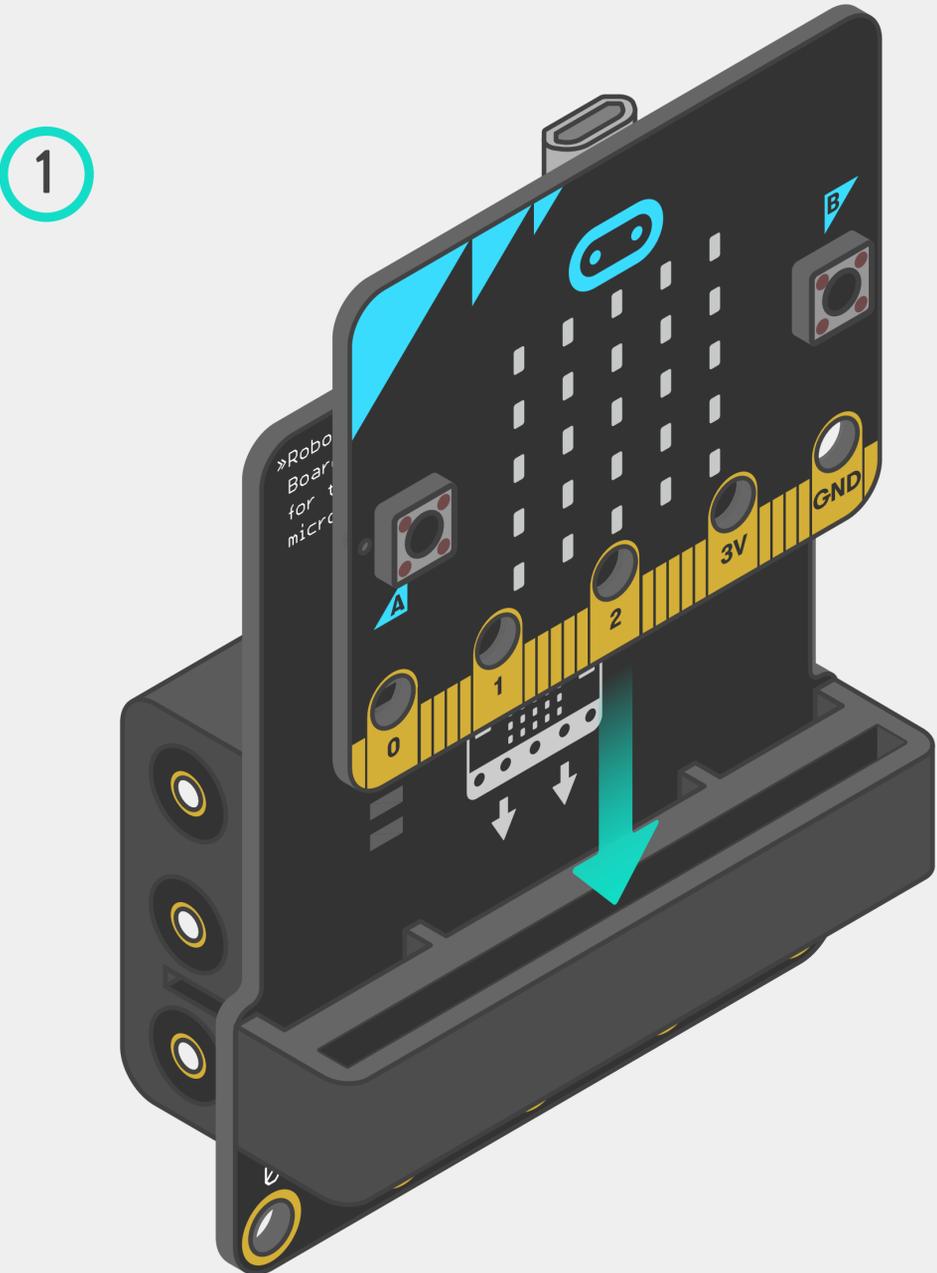


- 3 The green LED should light up if the batteries work

It's good practice to switch the power **OFF** when adding or removing motors. Also when plugging and unplugging the board.

# INSERTING THE MICRO:BIT

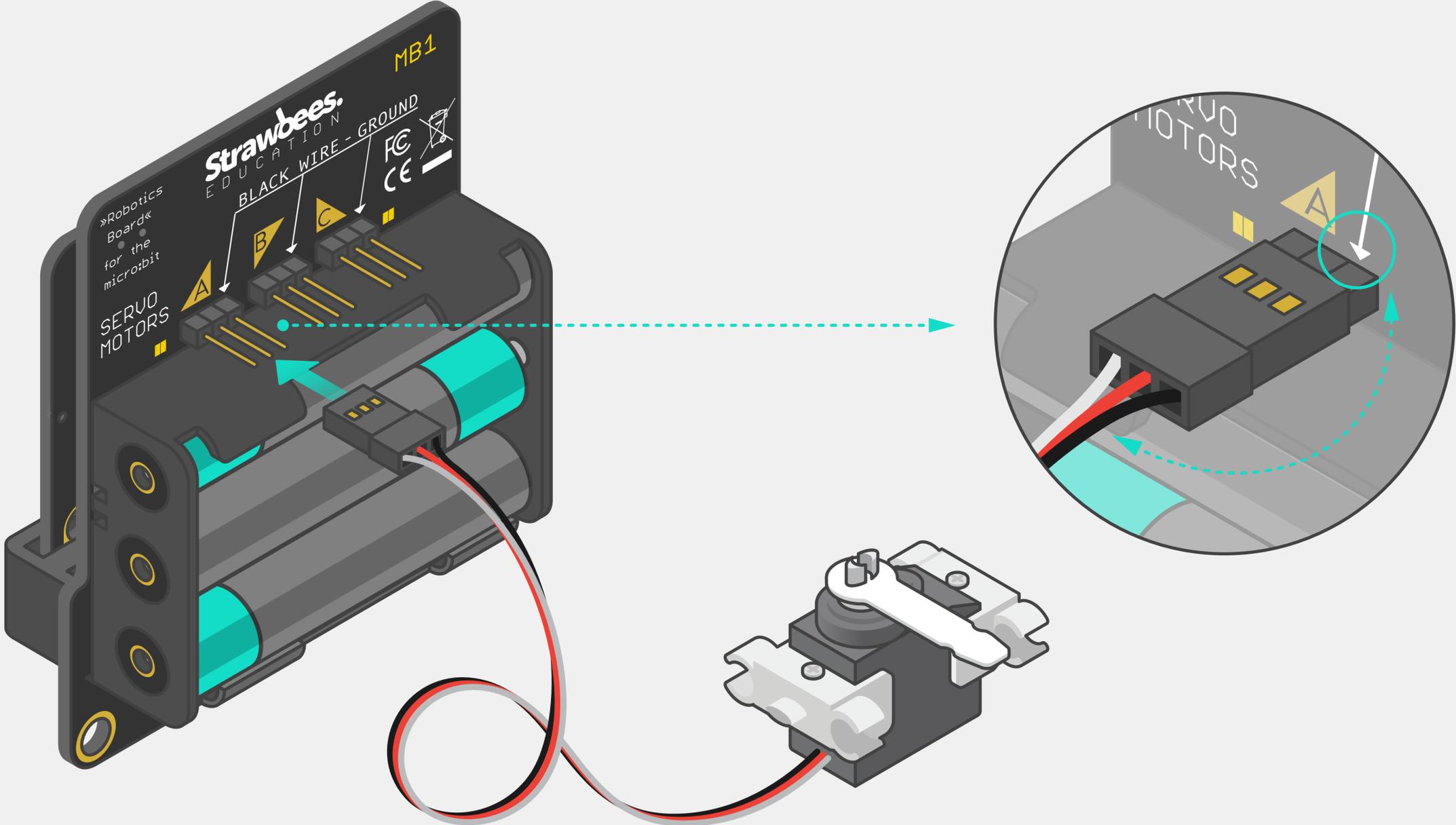
Slide the micro:bit to the Robotics board like this:





# CONNECTING THE MOTOR

It's possible to connect up to 3 servo motors at a time.

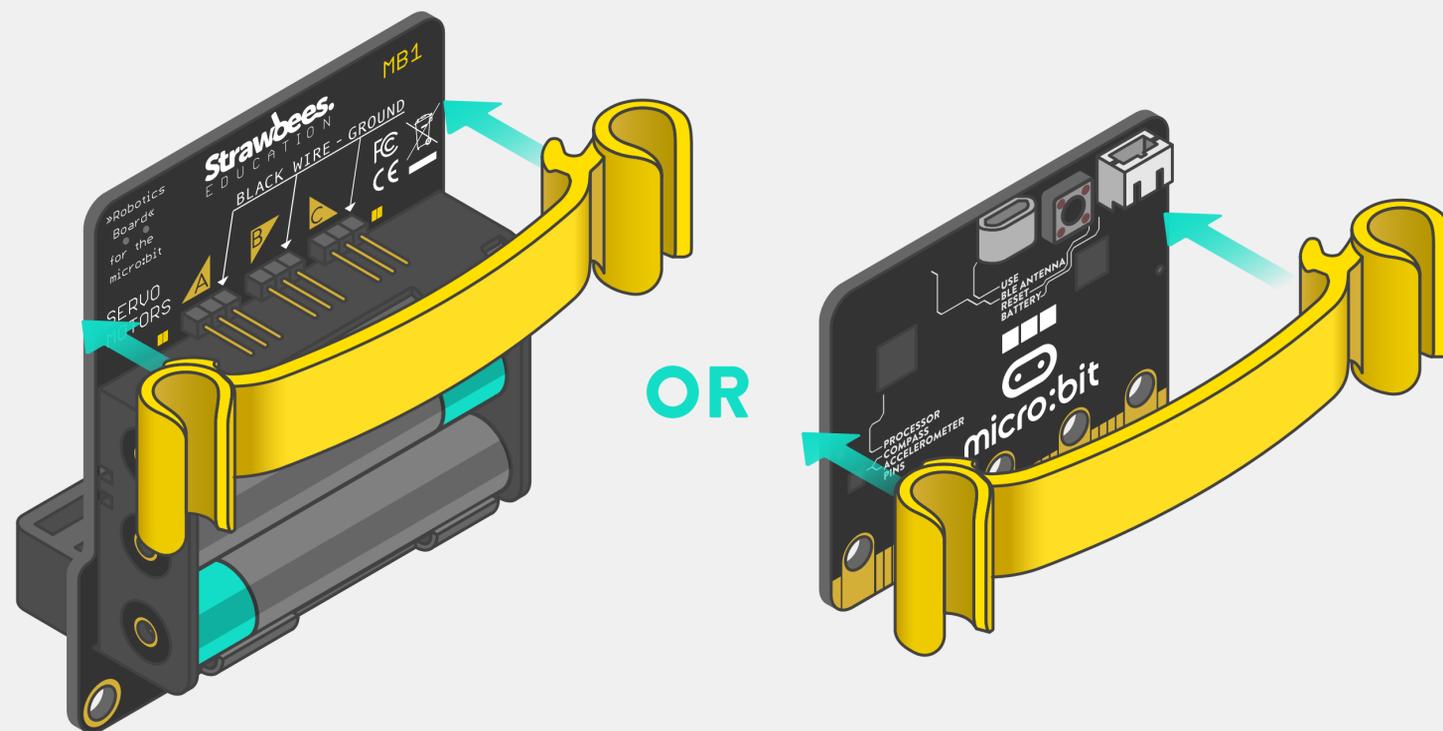


Make sure the the black cable is aligned with this marked arrow.

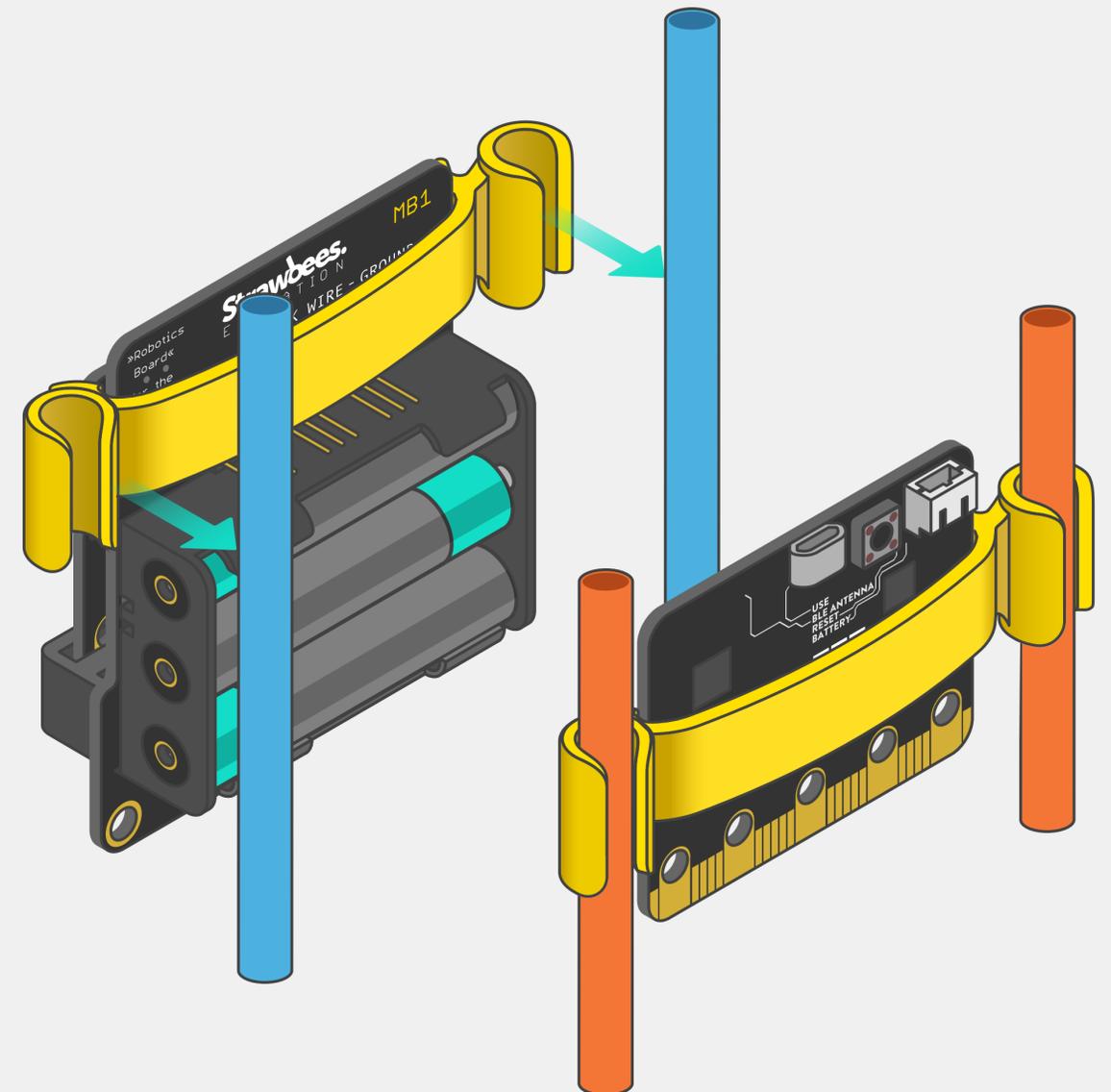
# ADD THE CLIP

The Clip makes it possible to connect the Robotics board or just the micro:bit to a Strawbees construction.

- 1 Snap on to the Robotics board or onto the micro:bit itself

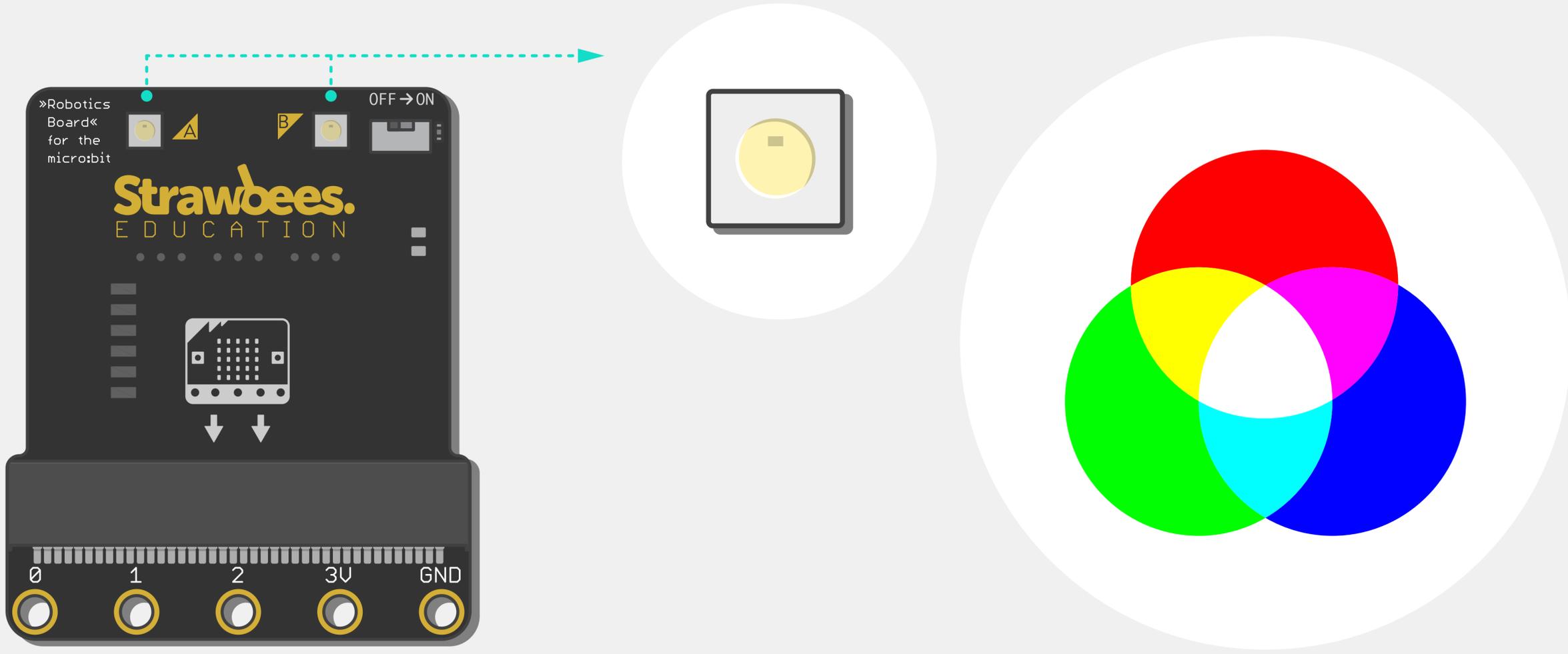


- 2 Connect Clip to straws



# RGB LEDs

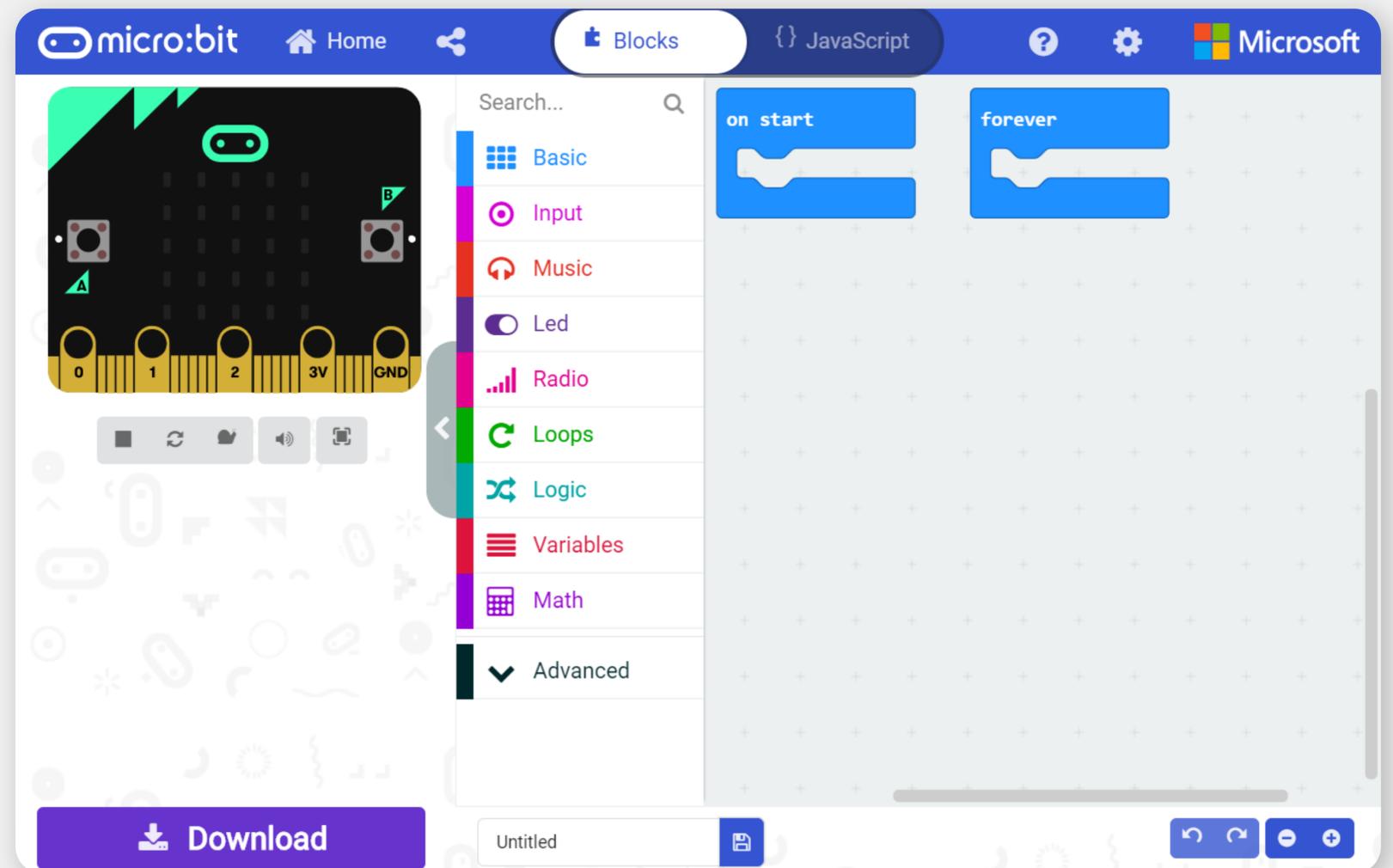
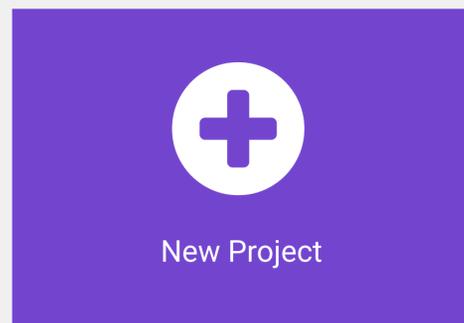
There are 2 RGB LEDs on the board and you can program them using the MakeCode editor.



# WHAT IS MAKECODE?

MakeCode is a way to program your micro:bit directly from the browser. It has support for the Robotics Board.

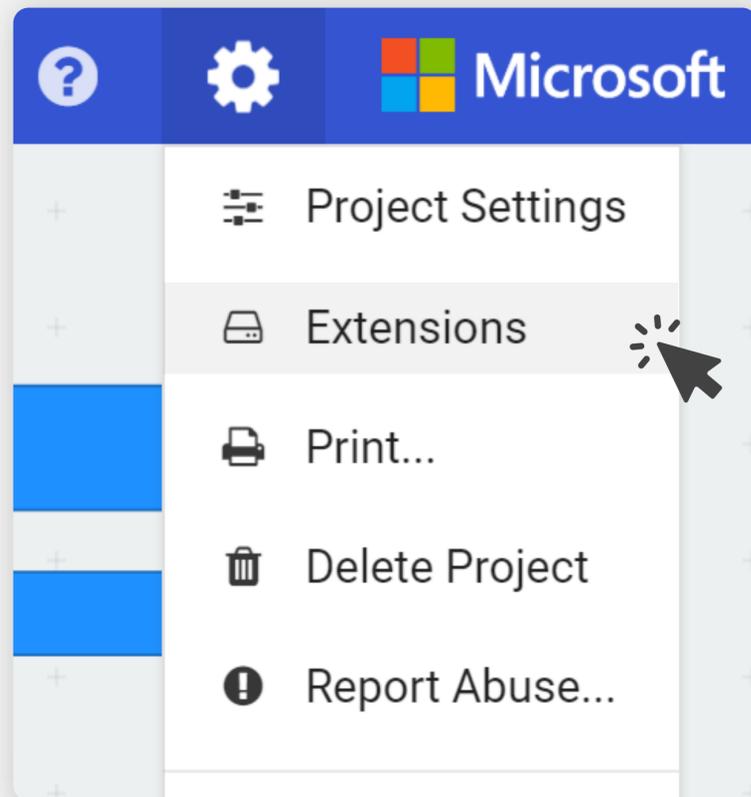
You can open the MakeCode editor by going to: [makecode.microbit.org](https://makecode.microbit.org) and click New Project



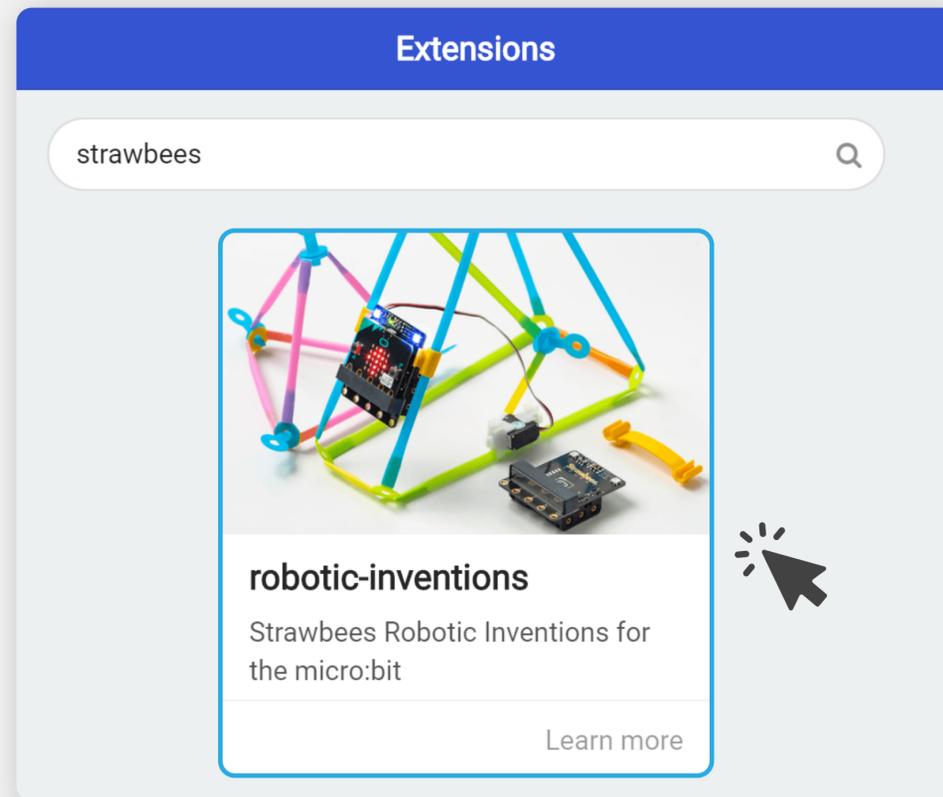
# INSTALLING THE STRAWBEES EXTENSION

To use the Robotics Board with make code, you should add the Strawbees Extension to your project like this:

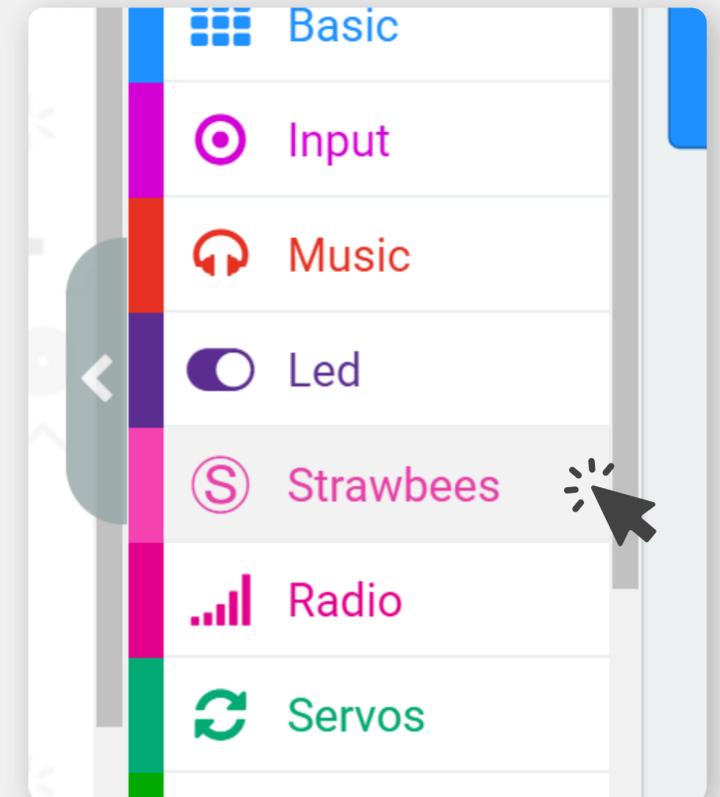
1 Click **Extensions** under Settings:



2 Type in Strawbees in the Search bar, press enter and click on **robotic-inventions**.



3 Strawbees will now appear with your MakeCode editor.



# GETTING STARTED WITH MAKECODE

If you have never used Makecode before we suggest that you become familiar with the basics before moving on to program with the Robotics Board.

Best places to get started are:

① [www.youtube.com/watch?v=ZegjmbyBUs8](https://www.youtube.com/watch?v=ZegjmbyBUs8)



② "Tutorials" section on <https://makecode.microbit.org>

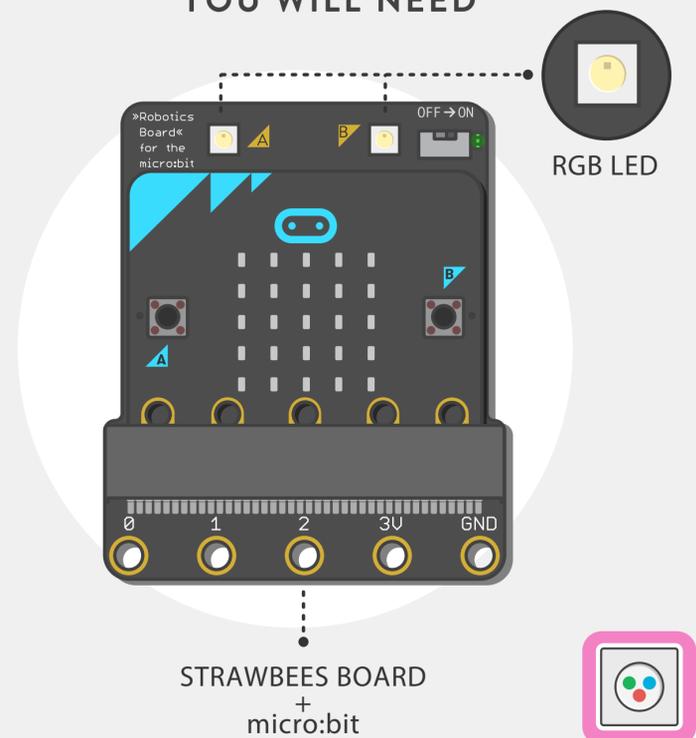


# WHAT ARE CODING CARDS?

## BLINK

```
forever
  set RGB LED A to white
  pause (ms) 1000
  set RGB LED A to black
  pause (ms) 1000
```

### YOU WILL NEED



[makecode.microbit.org](https://makecode.microbit.org)

Coding cards are small snippets of code that can be used to explore different concepts.

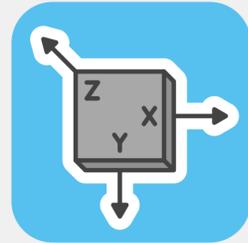
They are not meant to be used as they are but for you to tweak the numbers and combine the cards to get the expected result.

You can find the coding cards on [Strawbees Classroom](https://classroom.strawbees.com/page/robotic-inventions-for-microbit) and at the [Robotic Inventions' Makecode "learn more" page](https://makecode.microbit.org/pkg/strawbees/pxt-robotic-inventions).

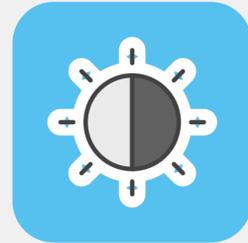
<https://classroom.strawbees.com/page/robotic-inventions-for-microbit>  
<https://makecode.microbit.org/pkg/strawbees/pxt-robotic-inventions>

# WHAT ARE CODING CARDS CATEGORIES?

Coding cards are grouped by hardware in use.



Accelerometer



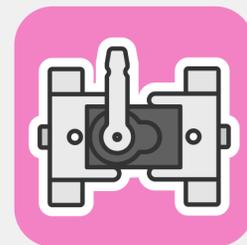
Light Sensor



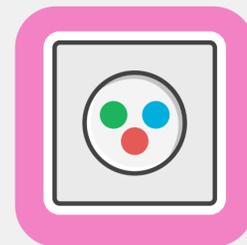
Button Press



Radio Receiver



Servo Motor



RGB LED



Radio Transmitter

# HOW TO TWEAK CODING CARD: BASIC CARD



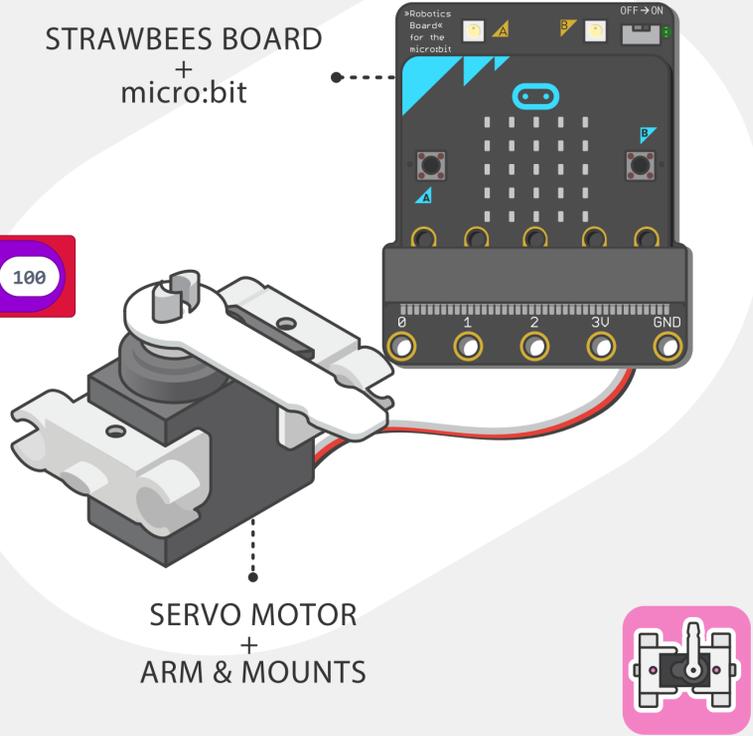
## GRADUALLY CHANGE POSITION

```
on start
  set position to 0

on button A pressed
  set position to constrain position + 4 between 0 and 100

forever
  set servo A position to position %
```

### YOU WILL NEED



[makecode.microbit.org](https://makecode.microbit.org)

Basic card

# HOW TO TWEAK CODING CARD:

The image displays a Scratch script with four main sections:

- on start** (blue block):
  - set **position** to **50** (red block). A callout bubble points to the number 50 with the text "Try different numbers".
- on button A pressed** (purple block):
  - set **position** to **constrain position + 10** between **0** and **100** (red block). A callout bubble points to the number 10 with the text "Try different numbers".
- on button B pressed** (purple block):
  - set **position** to **constrain position - 6** between **0** and **100** (red block). A callout bubble points to the number 6 with the text "Duplicate block and try different inputs".
- forever** (blue block):
  - set servo **A** position to **position** % (pink block).

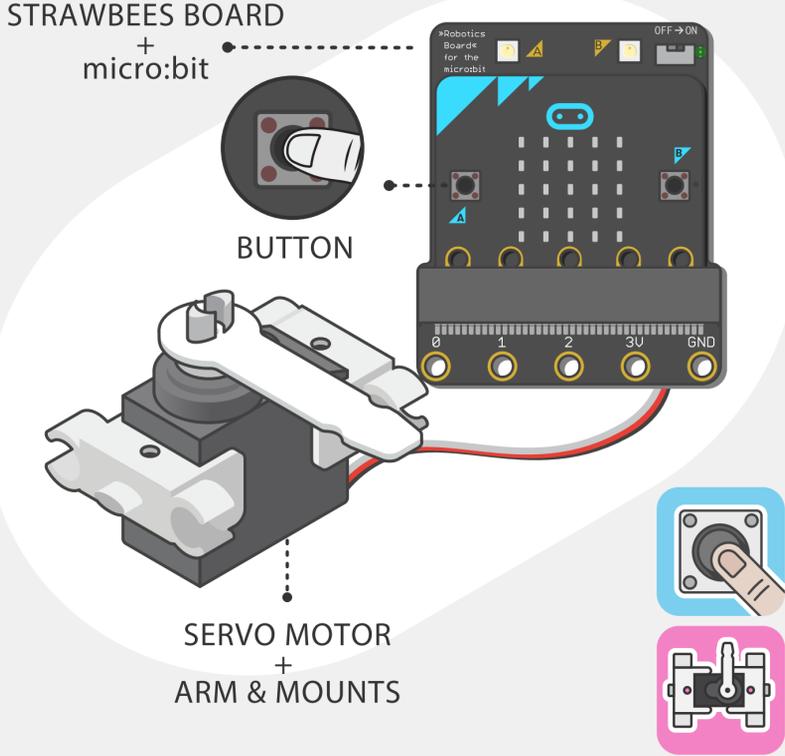
# HOW TO COMBINE CARDS

## CODING CARD A

### CHANGE POSITION WHILE PRESSING BUTTON

```
forever
  if button A is pressed then
    set servo A position to 0 %
  else
    set servo A position to 100 %
```

#### YOU WILL NEED

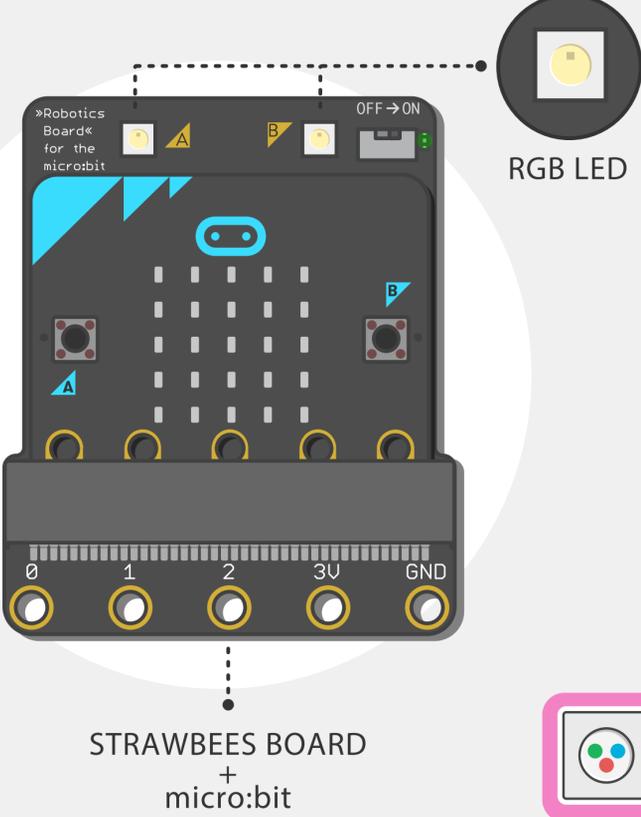


# HOW TO COMBINE CARDS: CODING CARD B

## CHANGE COLOR 10 TIMES

```
on start
  repeat 10 times
    do
      set RGB LED A to red 100 % green 0 % blue 0 %
      pause (ms) 500
      set RGB LED A to red 0 % green 0 % blue 100 %
      pause (ms) 500
  set RGB LED A to red 0 % green 0 % blue 0 %
```

### YOU WILL NEED



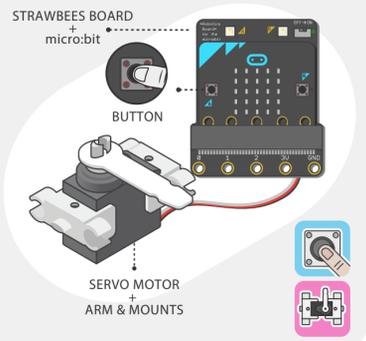
# HOW TO COMBINE CARDS: CODING CARD A + B

## CODING CARD A

**CHANGE POSITION WHILE PRESSING BUTTON**

YOU WILL NEED

- STRAWBEES BOARD + micro:bit
- BUTTON
- SERVO MOTOR
- ARM & MOUNTS



```
forever
  if button A is pressed then
    set servo A position to 0 %
  else
    set servo A position to 100 %
```

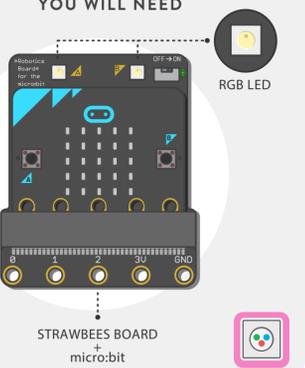
makecode.microbit.org

## CODING CARD B

**CHANGE COLOR 10 TIMES**

YOU WILL NEED

- STRAWBEES BOARD + micro:bit
- RGB LED



```
on start
  repeat 10 times
    do
      set RGB LED A to red 100 % green 0 % blue 0 %
      pause (ms) 500
      set RGB LED A to red 0 % green 0 % blue 100 %
      pause (ms) 500
  set RGB LED A to red 0 % green 0 % blue 0 %
```

makecode.microbit.org

How would you name this card?

```
forever
  if button A is pressed then
    set servo A position to 0 %
    repeat 10 times
      do
        set Neopixel A to red 100 % green 0 % blue 0 %
        pause (ms) 500
        set Neopixel A to red 0 % green 0 % blue 100 %
        pause (ms) 500
  else
    set servo A position to 100 %
    set Neopixel A to red 0 % green 0 % blue 0 %
```

# GRADUATED!

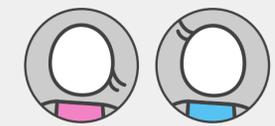
## Now you know how to:

- Assemble the Strawbees Robotics Board for the micro:bit.
- Use a battery to power the micro:bit.
- Use motors with the Robotics Board and the micro:bit.
- Connect the micro:bit to Strawbees structures.
- Installing and Getting Started with the Strawbees MakeCode extension.
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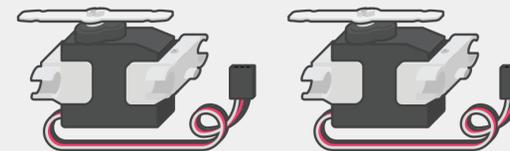
## Next steps:



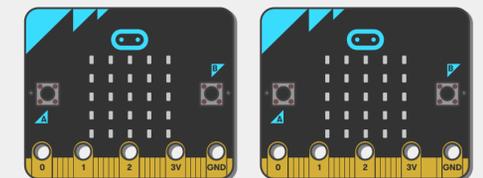
Pick an Activity from the Learning Platform to build



Pair with a friend to program a complex project



Make a project with two motors



Use two micro:bits in the same project