

2024-2025 Quality Education Fund Thematic Network - Tertiary Institutes

Progressive Development of STEAM Literacy through STEAM

Education and Self-directed Learning

透過STEAM教育自主學習有序發展STEAM素養

IoT濕度測試

馬頭涌官立小學

目錄

- 01 ThingSpeak IoT 介紹
- 02 IoT 編程
- 03 所需配件
- 04 裝置設置

ThingSpeakIoT

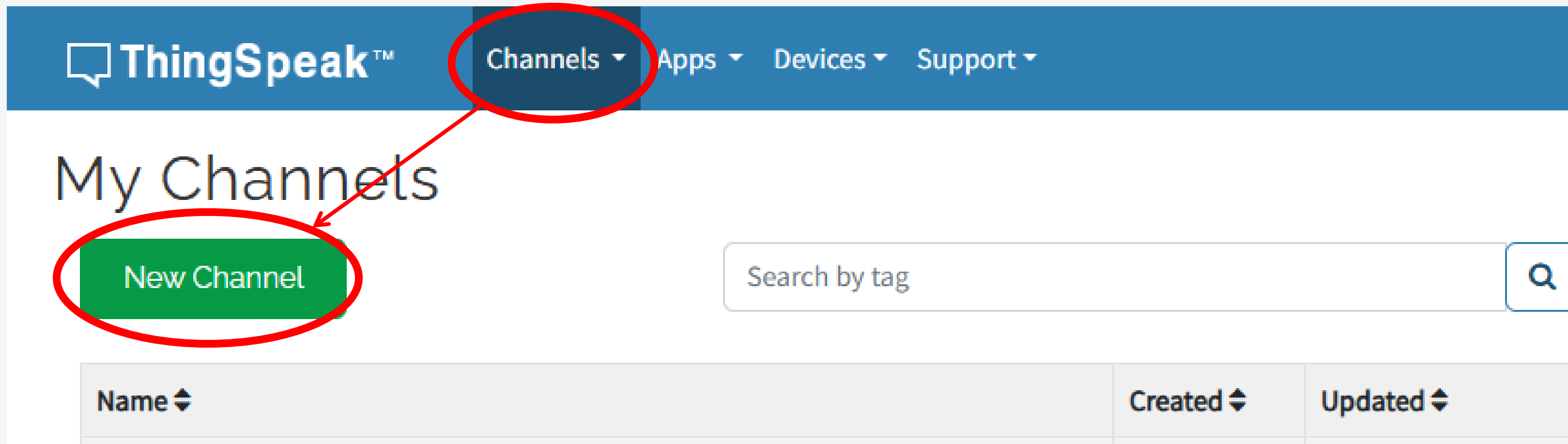
<https://thingspeak.mathworks.com/>

The screenshot shows the ThingSpeak website interface. At the top, there is a navigation bar with the ThingSpeak logo, links for Channels, Apps, and Support, and options for Commercial Use and How to Buy. Below the navigation bar, there is a message: "To use ThingSpeak, you must sign in with your existing MathWorks account or create a new one." This is followed by a paragraph explaining that non-commercial users can use ThingSpeak for free, while commercial users are eligible for a time-limited free evaluation. A link is provided for "paid license options".

The main content area features the MathWorks logo and a login form with an "Email" input field. Below the input field, there are links for "No account? Create one!" and "By signing in, you agree to our privacy policy." A "Next" button is located to the right of the form.

To the right of the login form is a diagram illustrating the ThingSpeak IoT architecture. It shows "SMART CONNECTED DEVICES" sending data to a cloud labeled "DATA AGGREGATION AND ANALYTICS ThingSpeak™". The cloud then sends data to a "MATLAB®" computer, which is used for "ALGORITHM DEVELOPMENT SENSOR ANALYTICS".

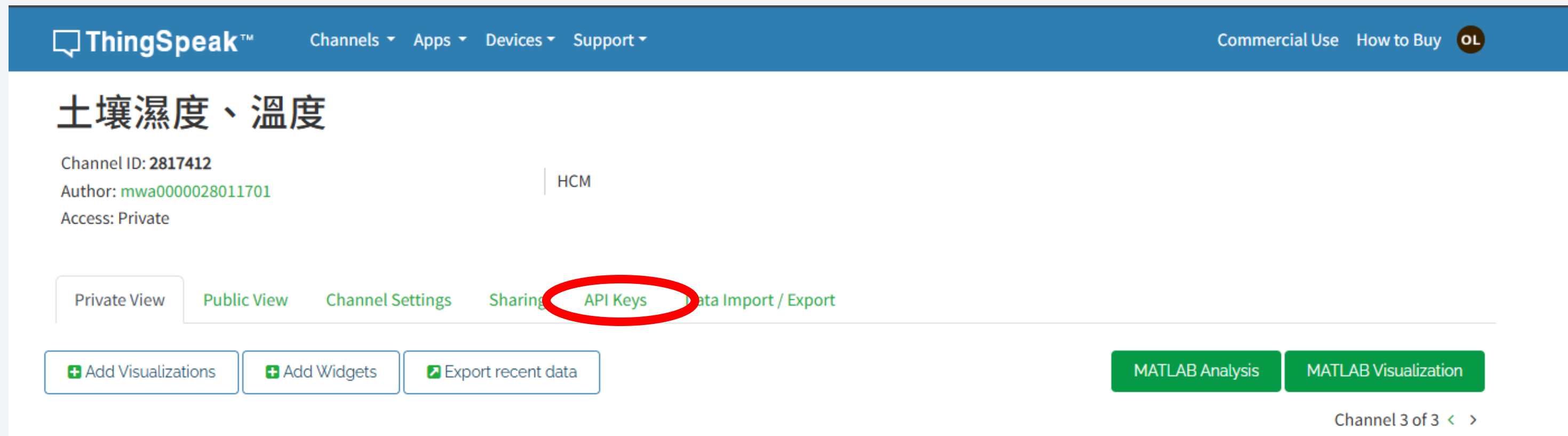
Create a New Channel



The screenshot shows the ThingSpeak website interface. At the top, there is a blue navigation bar with the ThingSpeak logo and several menu items: 'Channels', 'Apps', 'Devices', and 'Support'. The 'Channels' menu item is circled in red. Below the navigation bar, the main content area is titled 'My Channels'. A green button labeled 'New Channel' is also circled in red, with a red arrow pointing from the 'Channels' menu item to it. To the right of the 'New Channel' button is a search bar with the placeholder text 'Search by tag' and a magnifying glass icon. Below the search bar is a table with three columns: 'Name', 'Created', and 'Updated', each with a double-headed arrow icon indicating it is a sortable column.

Name ↕	Created ↕	Updated ↕
--------	-----------	-----------

Copy the API Key



The screenshot shows the ThingSpeak interface for a channel titled "土壤濕度、溫度". The channel ID is 2817412, the author is mwa0000028011701, and the access is Private. The "API Keys" tab is highlighted with a red circle. Below the tabs are buttons for "Add Visualizations", "Add Widgets", "Export recent data", "MATLAB Analysis", and "MATLAB Visualization". The channel is identified as "Channel 3 of 3".

ThingSpeak™ Channels ▾ Apps ▾ Devices ▾ Support ▾ Commercial Use How to Buy OL

土壤濕度、溫度

Channel ID: 2817412
Author: [mwa0000028011701](#) | HCM
Access: Private

Private View Public View Channel Settings Sharing **API Keys** Data Import / Export

+ Add Visualizations + Add Widgets Export recent data

MATLAB Analysis MATLAB Visualization

Channel 3 of 3 < >

土壤濕度、溫度

Channel ID: 2817412

Author: mwa0000028011701

Access: Private

HCM

Private View

Public View

Channel Settings

Sharing

API Keys

Data Import / Export

Write API Key

Key 0M7VAYTLUMR9GZZL

Generate New Write API Key

Read API Keys

Key VHQ5UYAHW22L0NR8

Note

Save Note

Delete API Key

Add New Read API Key

Help

API keys enable you to write data to a channel or read data from a private channel. API keys are auto-generated when you create a new channel.

API Keys Settings

- **Write API Key:** Use this key to write data to a channel. If you feel your key has been compromised, click **Generate New Write API Key**.
- **Read API Keys:** Use this key to allow other people to view your private channel feeds and charts. Click **Generate New Read API Key** to generate an additional read key for the channel.
- **Note:** Use this field to enter information about channel read keys. For example, add notes to keep track of users with access to your channel.

API Requests

Write a Channel Feed

```
GET https://api.thingspeak.com/update?api_key=0M7VAYTLUMR9GZZL&field1=0
```

Read a Channel Feed

```
GET https://api.thingspeak.com/channels/2817412/feeds.json?api_key=VHQ5UYAHW22L0NR8
```

Read a Channel Field

```
GET https://api.thingspeak.com/channels/2817412/fields/1.json?api_key=VHQ5UYAHW22L0NR8
```

Makecode

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

The screenshot displays the Makecode web interface. At the top, there is a navigation bar with the Microsoft logo, a 'micro:bit' link, a settings gear icon, and a 'Sign In' button. Below the navigation bar is a large banner with a colorful illustration of a girl with pink hair interacting with a micro:bit device. The main content area is divided into two sections: 'My Projects' and 'Tutorials'. The 'My Projects' section features a 'New Project' button (a purple square with a white plus sign) and a grid of project cards. Each card includes a puzzle piece icon, a title, and a timestamp. The 'Tutorials' section shows a row of tutorial cards with illustrations and titles. The 'New Project' button is highlighted with an orange border.

Microsoft | micro:bit

Introduction to the BBC micro:bit

Show Instructions

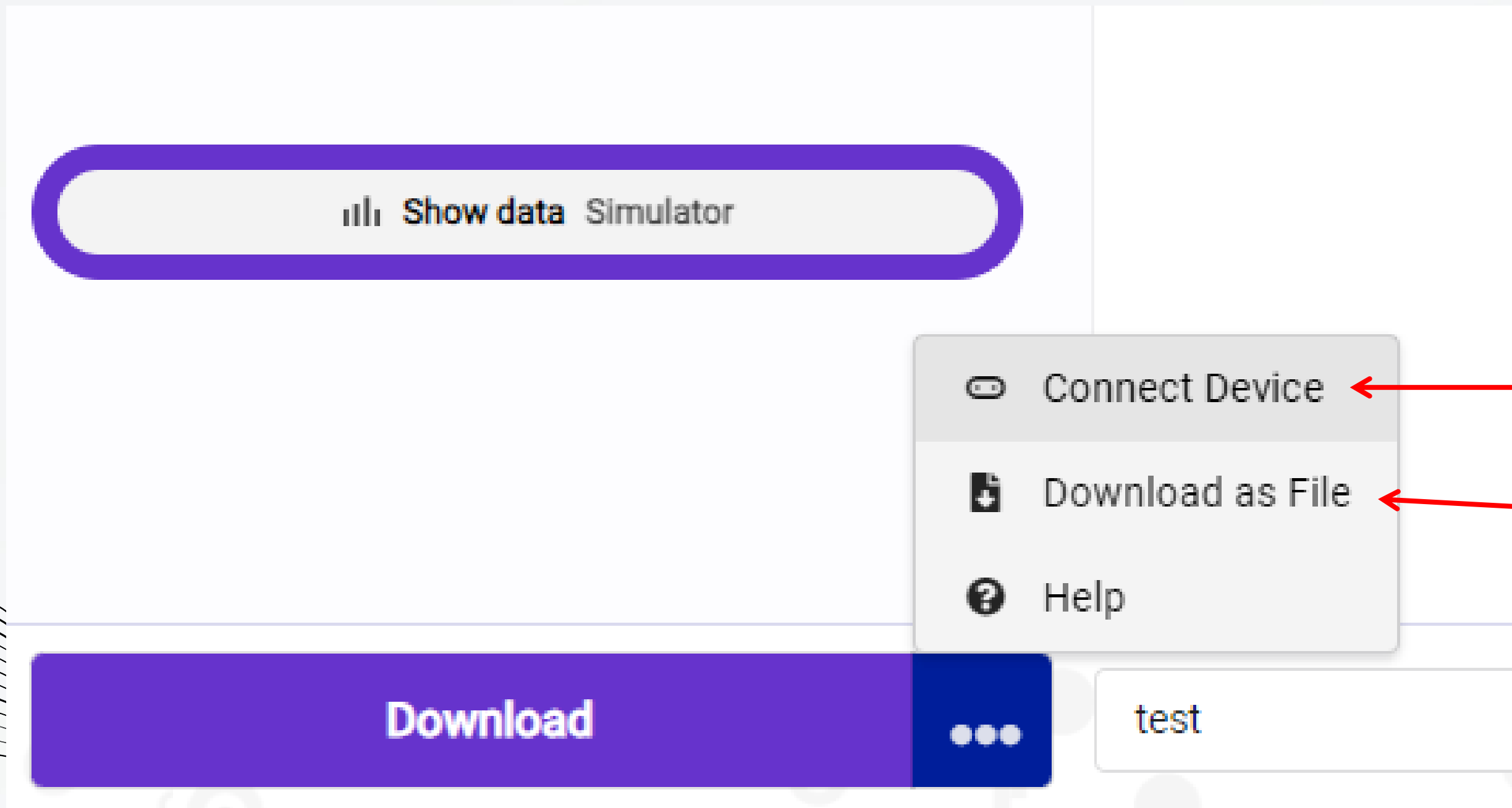
My Projects [View All](#) [Import](#)

- New Project
- EC test 0 (4 minutes ago)
- EC test1 (15 minutes ago)
- DHT11 (20 hours ago)
- AI Robots Serial Connection Starter Code (1 month ago)
- smartphone (1 month ago)
- AI (1 month ago)

Tutorials

- New? Start Here
- Flashing Heart
- Name Tag
- Smiley Buttons
- Dice
- Love Meter
- Micro Chat

How to connect with micro:bit?



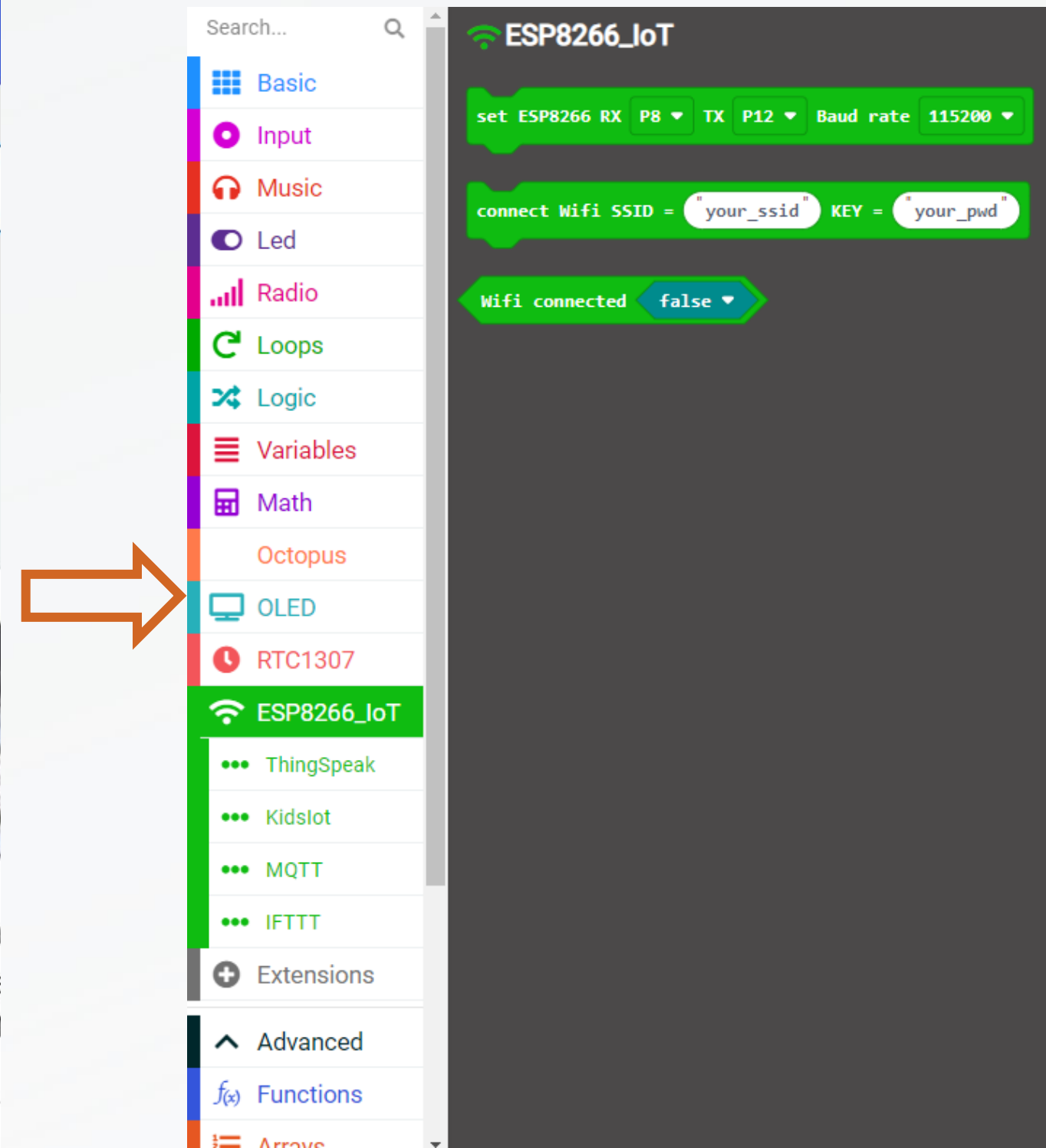
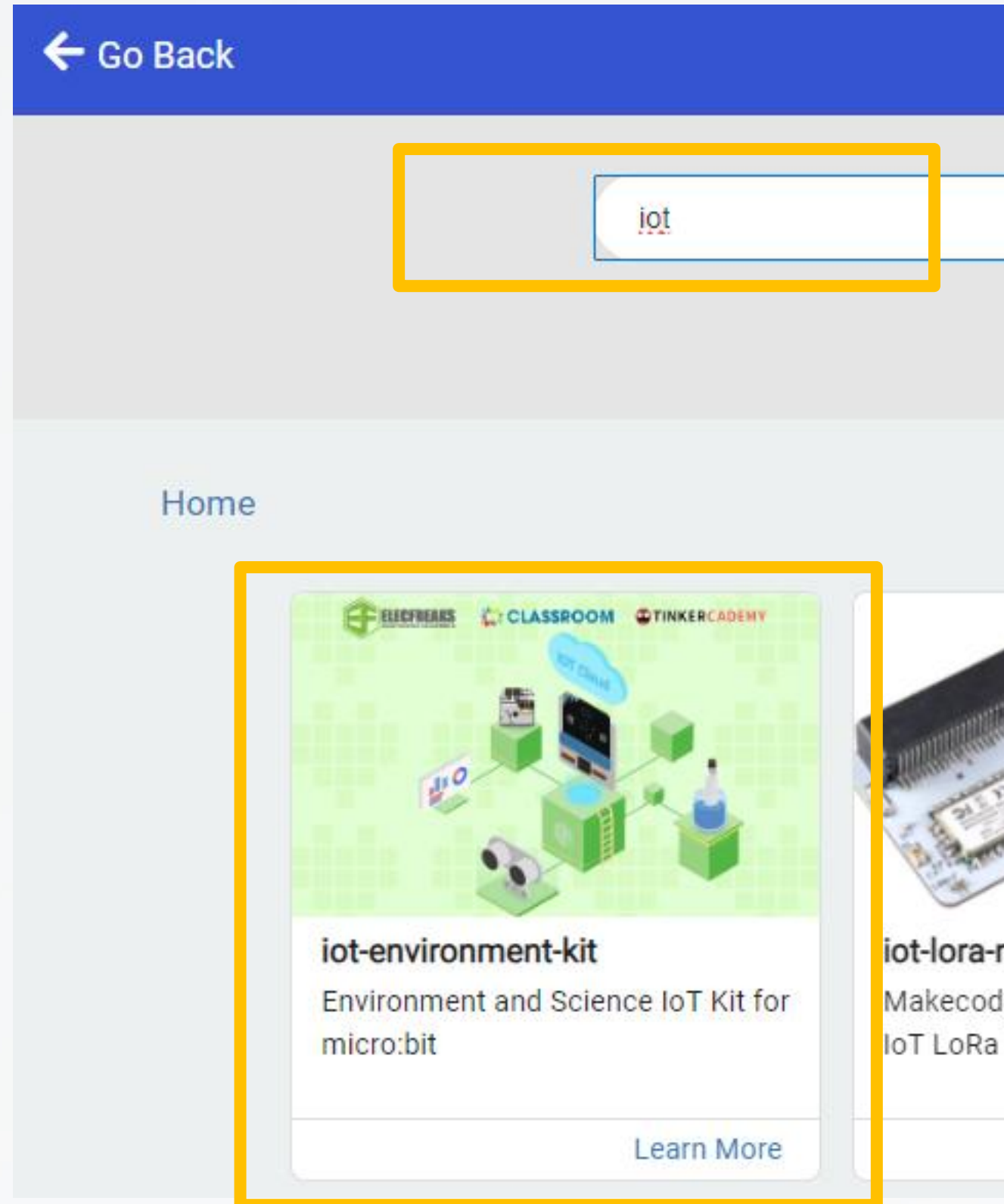
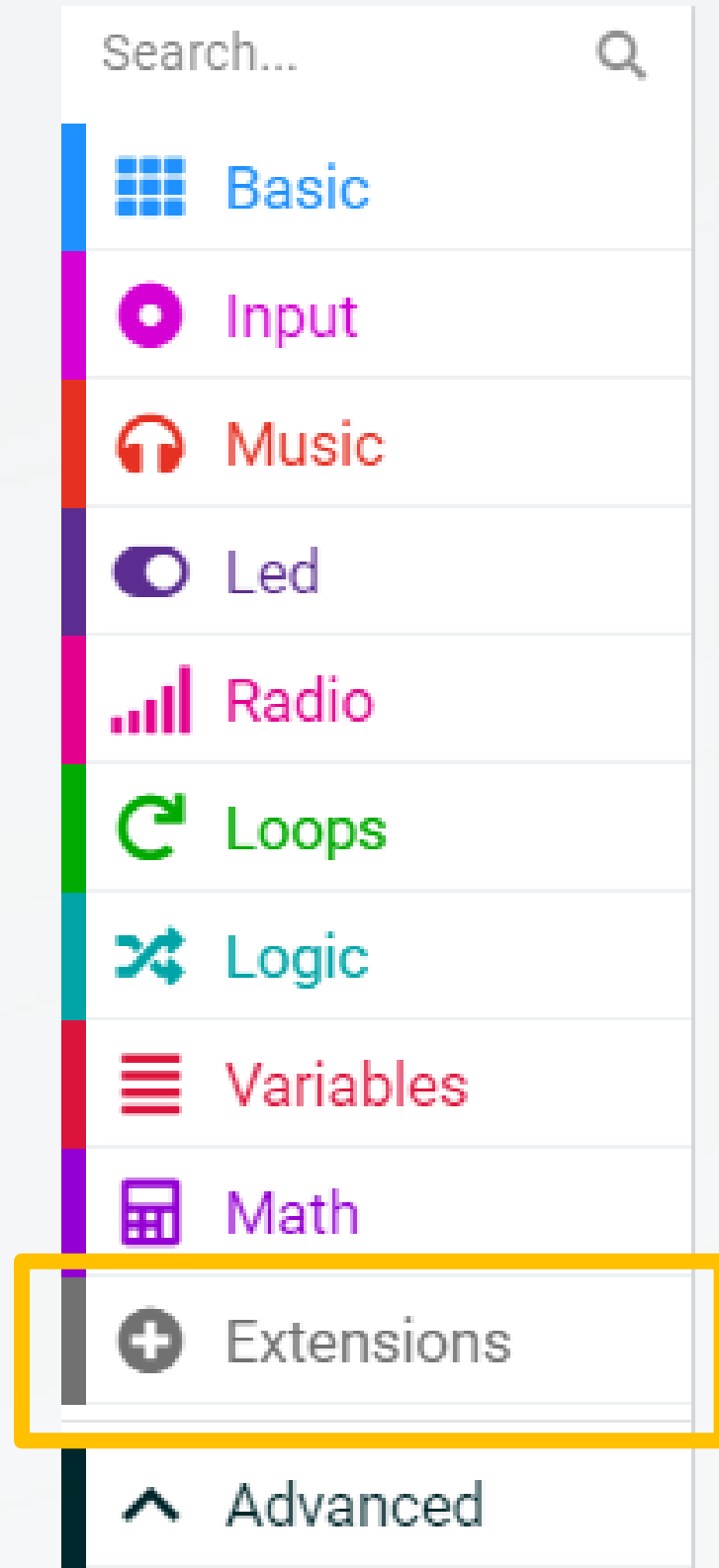
1. Connect Device

2. Download

Add extensions to Makecode

1. Click "Extensions"

2. Search "iot" and
choose "datalogger"



DHT11

Lights

DHT11_DHT22
BBC micro:bit MakeCode extension
for DHT11/DHT22 humidity and
temperature sensors

[Learn More](#)

bplab
It is a make c
can control al
Lab such as L

Blocks

Search...

- Basic
- Input
- Music
- Led
- DHT11/DHT22**
- more
- Radio
- Loops
- Logic
- Variables
- Math
- Data Logger
- Octopus
- OLED
- TFT24
- RTC1307
- ESP8266_IoT
- Extensions

DHT11/DHT22

Last query successful?

Read humidity ▾

Query DHT11 ▾

Data pin P0 ▾

Pin pull up true ▾

Serial output false ▾

Wait 2 sec after query true ▾

Search...

- Basic
- Input
- Music
- Led
- Radio
- Loops
- Logic
- Variables
- Math
- Octopus
- OLED
- RTC1307
- ESP8266_IoT
 - ThingSpeak
 - Kidslot
 - MQTT
 - IFTTT
- Extensions
- Advanced
- Functions
- Arrows

ESP8266_IoT

- set ESP8266 RX P8 TX P12 Baud rate 115200
- connect Wifi SSID = "your_ssid" KEY = "your_pwd"
- Wifi connected false

on start

Wi-Fi名稱 Wi-Fi密碼

set ESP8266 RX P8 TX P12 Baud rate 115200

connect Wifi SSID = " " KEY = " "

if Wifi connected true then

- show icon
- pause (ms) 1000
- clear screen

確保Wi-Fi連接成功

The image shows the Scratch 'ThingSpeak' block palette. The 'ThingSpeak' category is highlighted with a yellow box. The palette includes the following blocks:

- connect thingspeak
- set data to send ThingSpeak
- Write API key = "your_write_api_key"
- Field 1 = 0
- Upload data to ThingSpeak
- ThingSpeak connected false

The image shows a Scratch script for uploading data to ThingSpeak. The script is as follows:

```
forever loop:  
  pause (ms) 1000  
  connect thingspeak  
  set data to send ThingSpeak  
  Write API key = [API Key]  
  Field 1 = value of dht11 humidity(0~100) at pin P1  
  Field 2 = value of dht11 temperature(°C) at pin P1  
  Upload data to ThingSpeak  
  pause (ms) 1000  
  show string join "H" value of dht11 humidity(0~100) at pin P1  
  show string join "T" value of dht11 temperature(°C) at pin P1
```

The 'forever' loop block is circled in yellow. The 'Write API key' block is circled in red, with a red arrow pointing to it from a text box that says "Copy the API Key from ThingSpeak and Paste".

A screenshot of the Scratch 'Text' block palette. The 'Text' category is selected and highlighted with a yellow box. Within this category, the 'join' block is also highlighted with a yellow box. The 'join' block is shown with 'Hello' and 'World' as inputs. Other visible blocks include 'length of', 'parse to number', 'split', 'substring of', 'compare', 'char from', and 'char code from'.

A screenshot of a Scratch script on a grid background. The script is enclosed in a 'forever' loop. The steps are: 1. 'pause (ms) 1000' (blue block). 2. 'connect thingspeak' (green block). 3. 'set data to send ThingSpeak' (green block). 4. 'Write API key = [text input]' (green block). 5. 'Field 1 = value of dht11 humidity(0~100) at pin P1' (orange block). 6. 'Field 2 = value of dht11 temperature(°C) at pin P1' (orange block). 7. 'Upload data to ThingSpeak' (green block). 8. 'pause (ms) 1000' (blue block). 9. 'show string join "H" value of dht11 humidity(0~100) at pin P1' (blue block). 10. 'show string join "T" value of dht11 temperature(°C) at pin P1' (blue block). The 'show string' blocks are highlighted with a yellow box.

The screenshot displays the MakeCode Microbit IDE interface. The top navigation bar includes 'Blocks' and 'JavaScript' tabs, along with icons for home, share, help, settings, and a user profile 'LS'. On the left, a sidebar lists various hardware components like Basic, Input, Music, Led, DHT11/DHT22, Radio, Loops, Logic, Variables, Math, ESP8266_IoT, OLED, TFT24, RTC1307, Octopus, Data Logger, and Extensions.

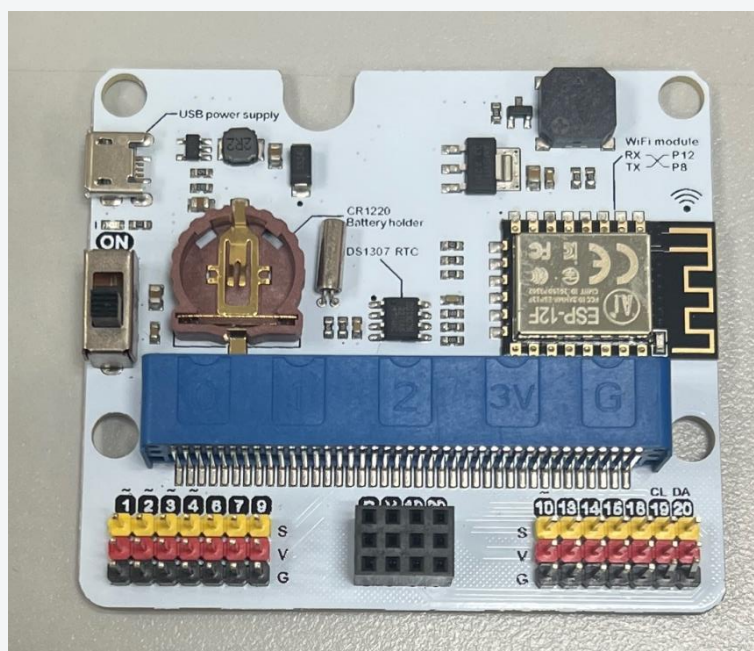
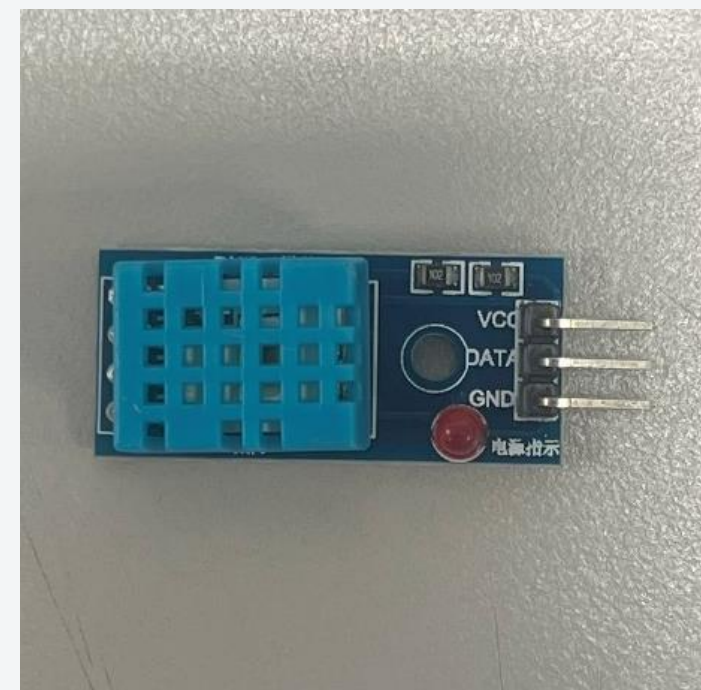
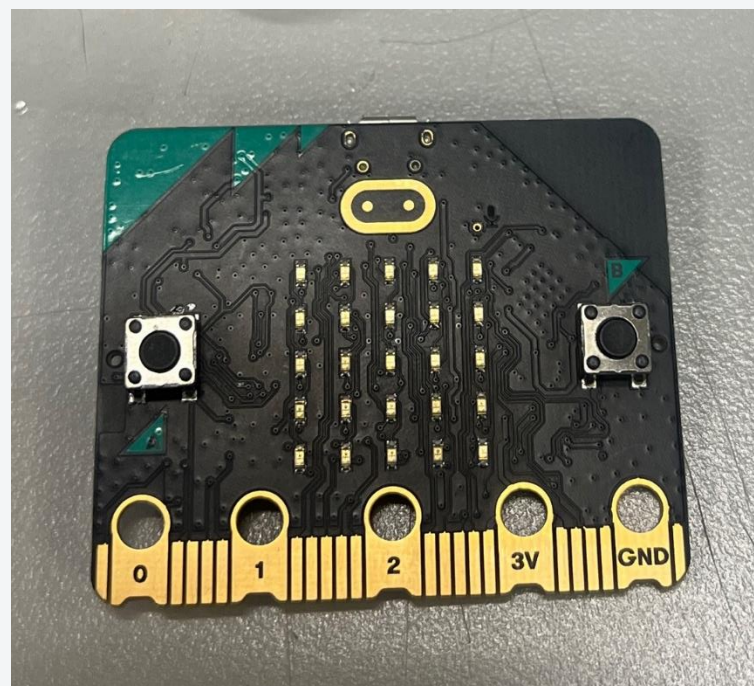
The main workspace contains two JavaScript code blocks:

```
on start
  set ESP8266 RX P8 TX P12 Baud rate 115200
  connect Wifi SSID = [SSID] KEY = [KEY]
  if Wifi connected true then
    show icon [grid icon]
    pause (ms) 1000
    clear screen
  +

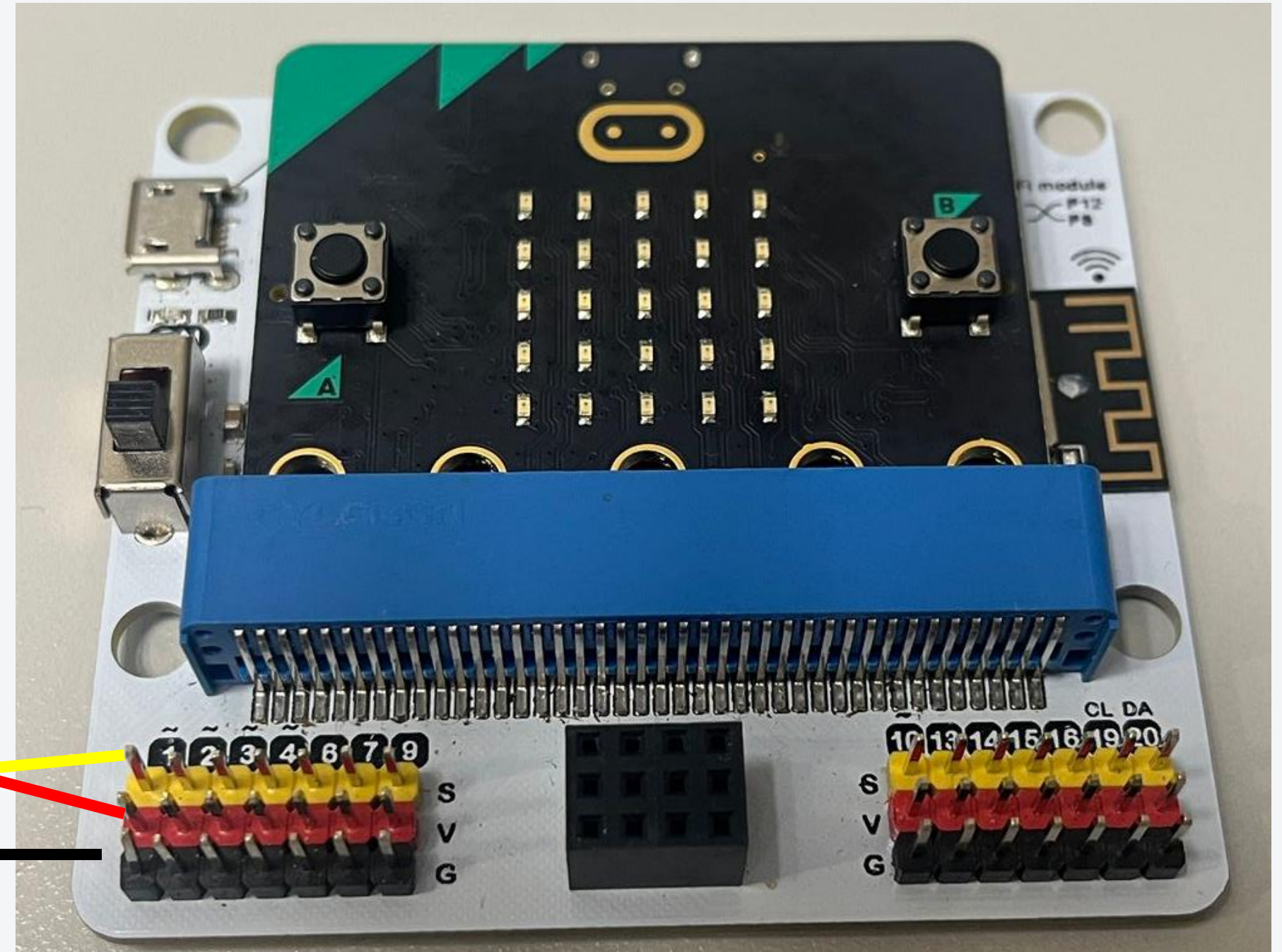
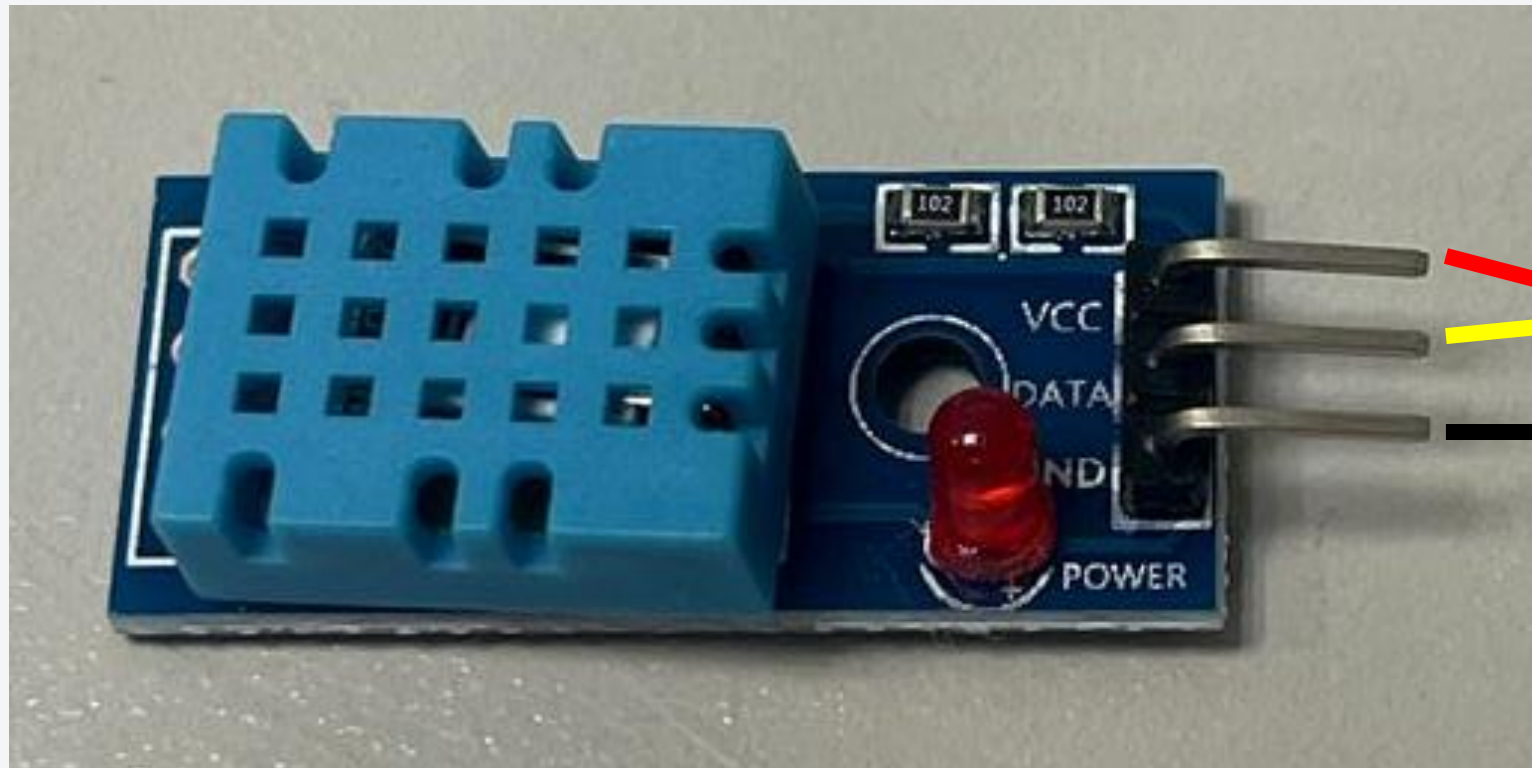
forever
  pause (ms) 1000
  connect thingspeak
  set data to send ThingSpeak
  Write API key = [API key]
  Field 1 = value of dht11 humidity(0~100) at pin P1
  Field 2 = value of dht11 temperature(°C) at pin P1
  Upload data to ThingSpeak
  pause (ms) 1000
  show string join "H" value of dht11 humidity(0~100) at pin P1
  show string join "T" value of dht11 temperature(°C) at pin P1
```

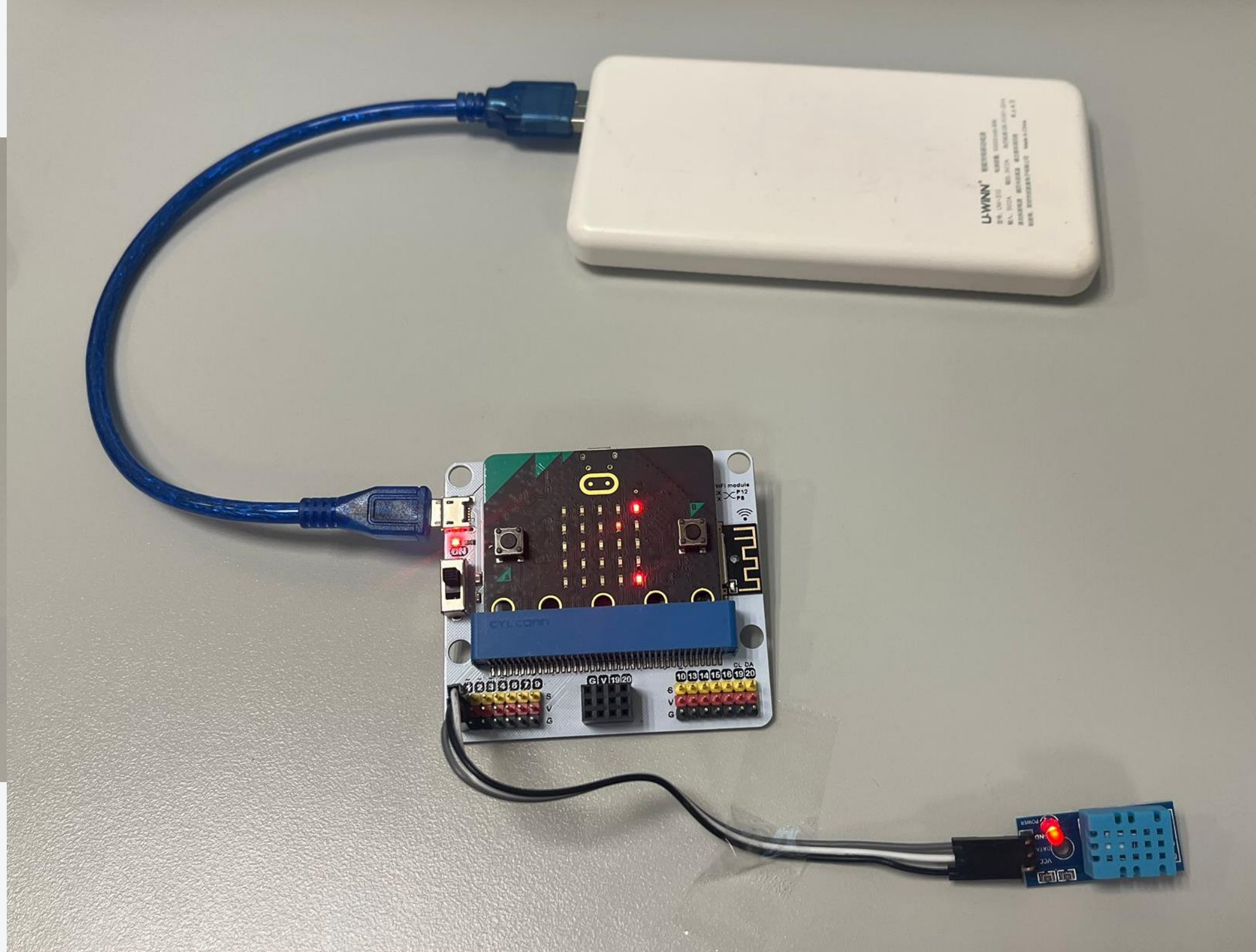
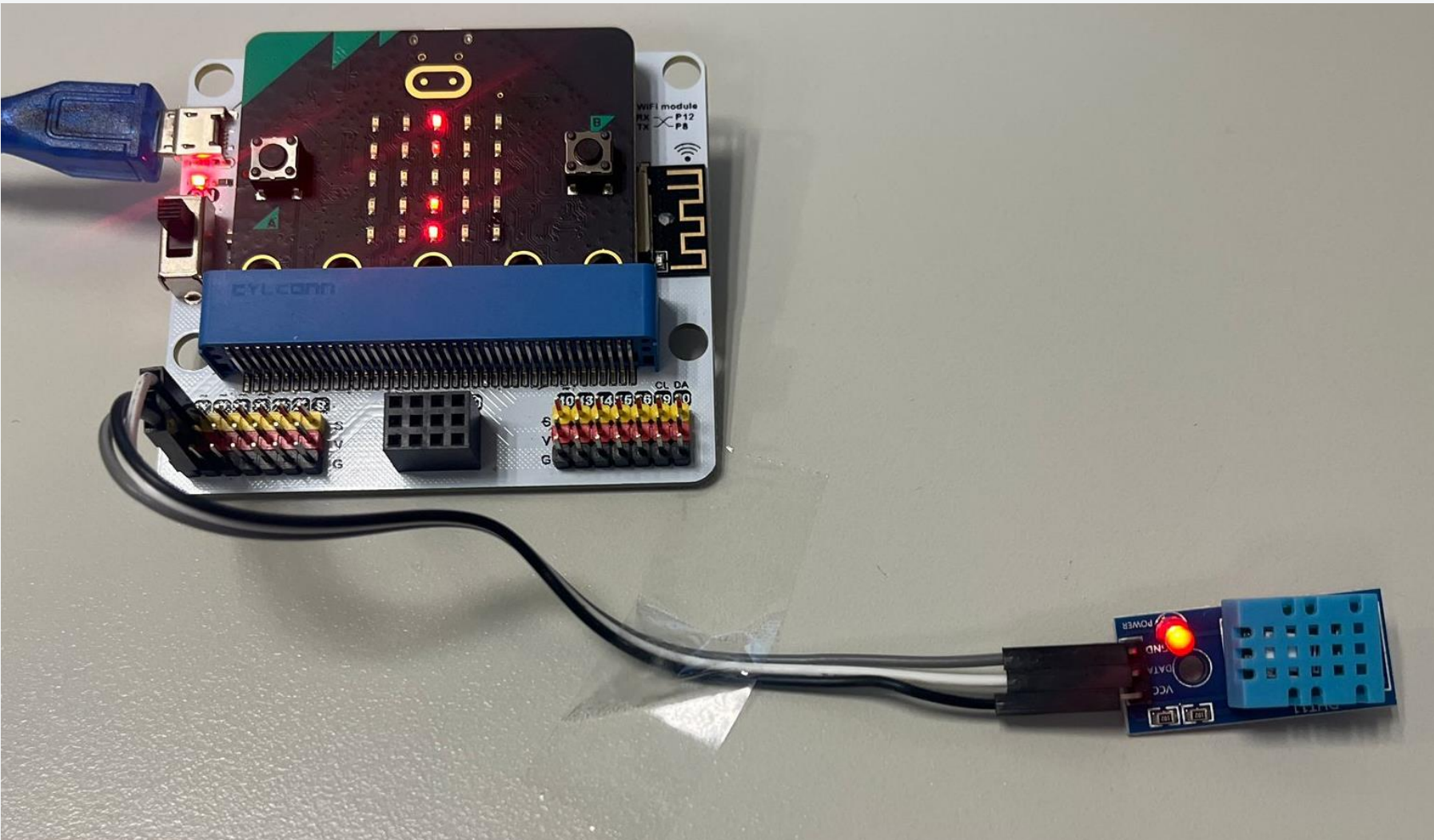
所需材料

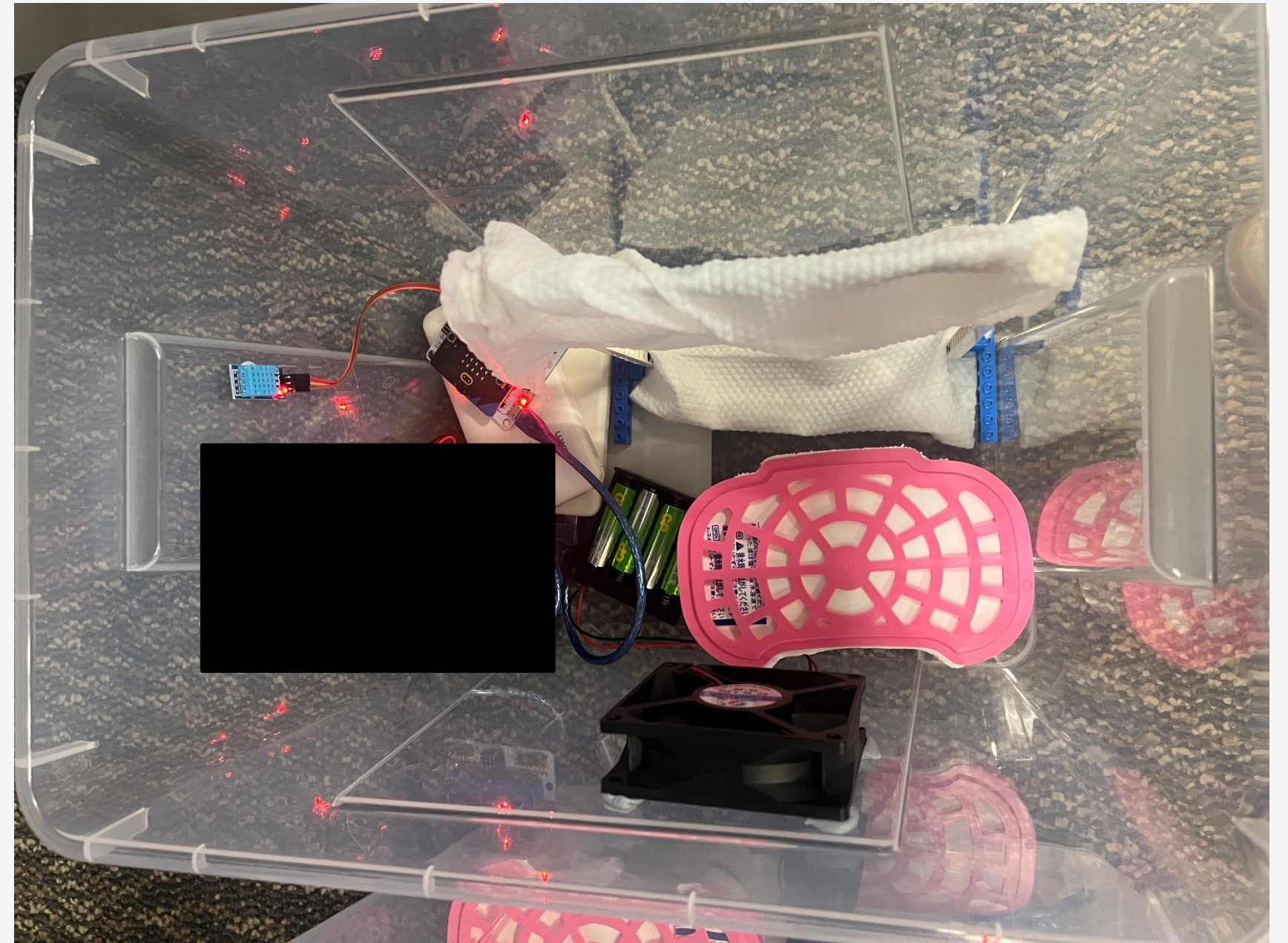
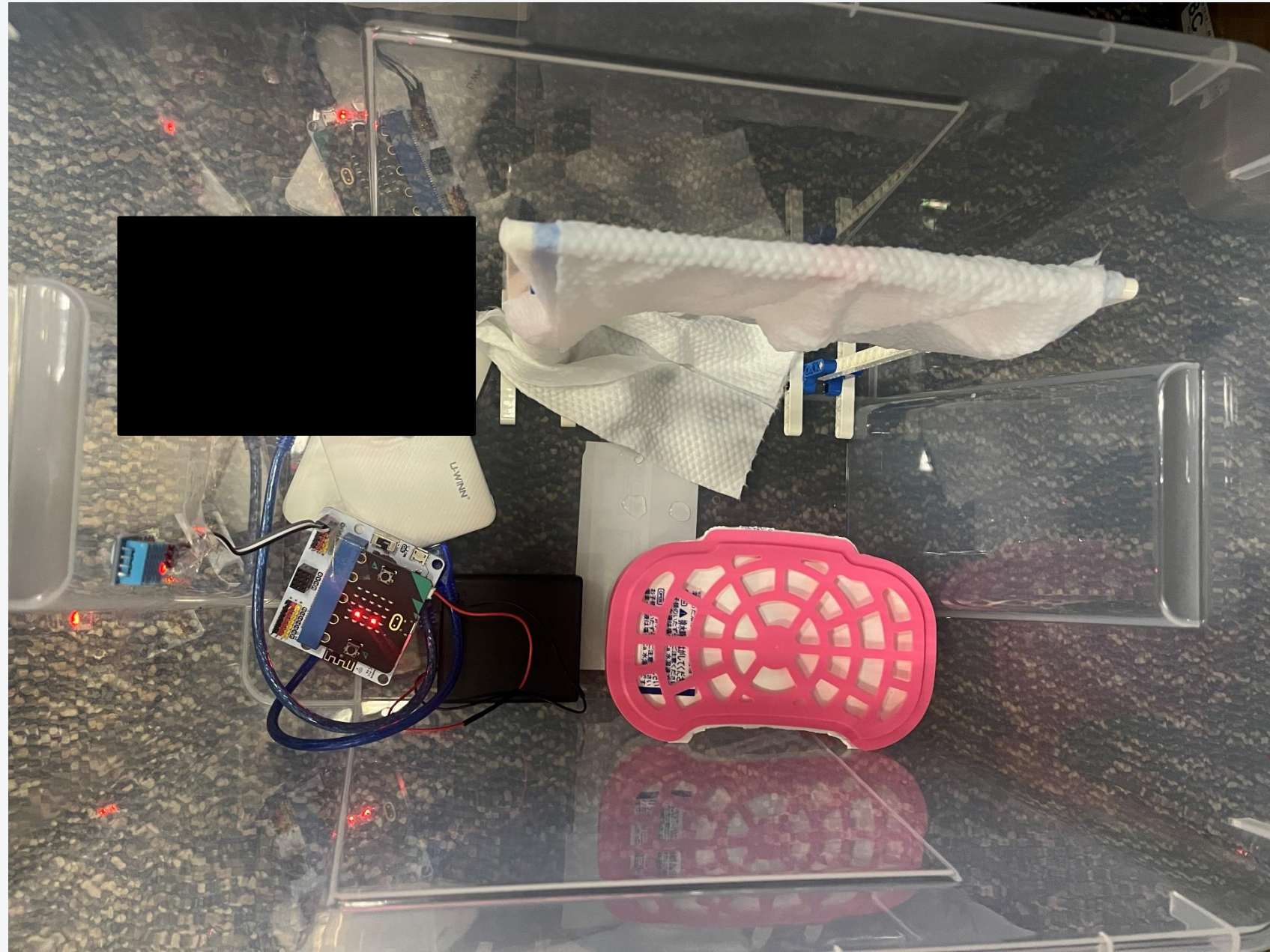
IoT板
Micro:bit
DHT11
杜邦綫
電池
風扇
尿袋
洗臉巾
吸濕盒



VCC to V
DATA to S
GND to G







Evaluation



<https://forms.gle/QSa8PszA7iZKfS5G8>

IoT- Ms Olivia Liu



<https://forms.gle/X3k2aaF1AsmefGd97>

PDAR- Mr Tang Kuen Yan