

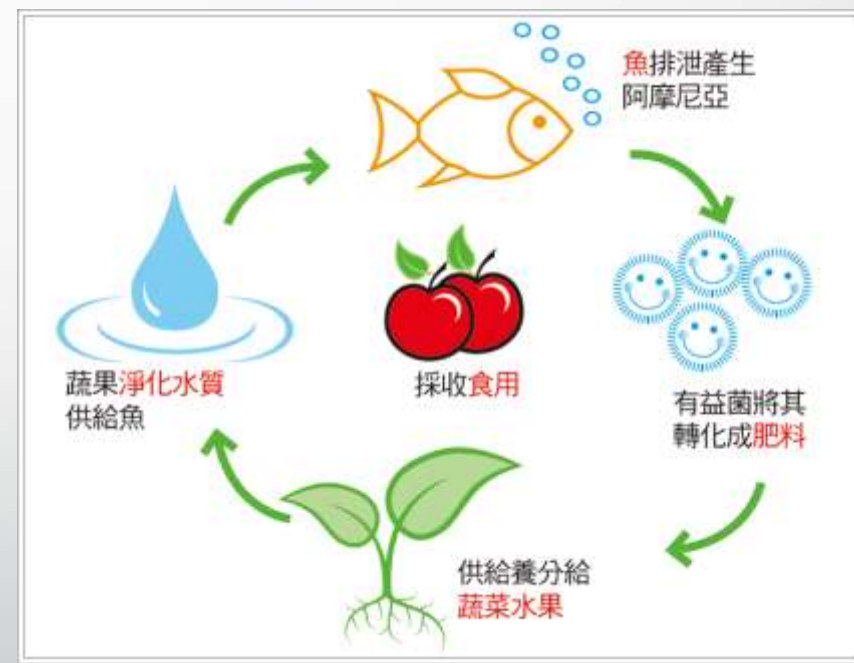
The Education University of Hong Kong 2021-2022 Quality Education Fund Thematic Network – Tertiary Institutes STEM Project Team

SCHOOL: TWGHS C.Y. MA MEMORIAL COLLEGE (S1)

TOPIC: AQUAPONICS MEASUREMENT WITH
MICRO:BIT WORKSHOP

魚菜共生 (Aquaponics) - 水質檢測

- pH Value
- Temperature
- Turbidity
- Dissolved Oxygen
- Nitrate Sensor



pH Sensor SEN0161-V2

Sensors / Liquid Sensors / Gravity: Analog pH Sensor/Meter Kit V2



Gravity: Analog pH Sensor/Meter Kit V2

SKU:SEN0161-V2 Brand:DFRobot Reward Points: 395

\$39.50

In Stock

Quantity Based Price

QTY	DISCOUNT
3-4	\$37.50
5-9	\$35.50
10+	\$33.50

Categories: Sensors All Products Liquid Sensors

Topic: Gravity

* Model:

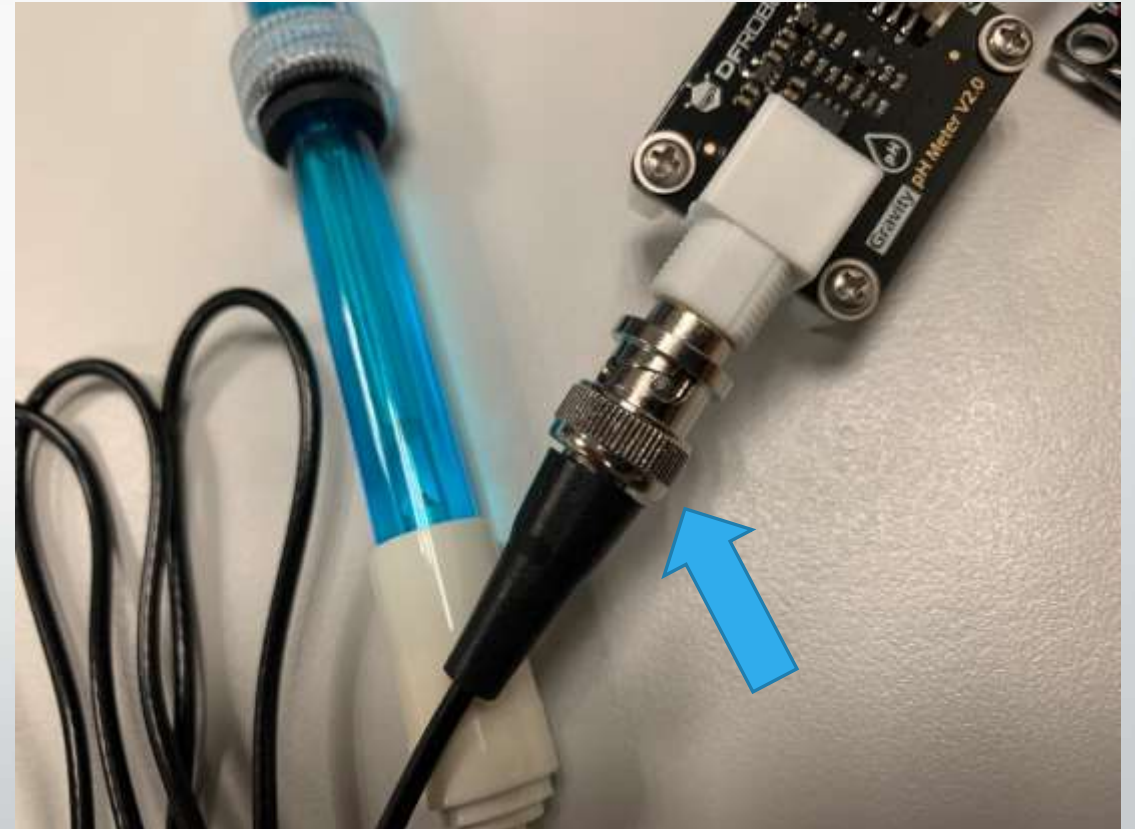
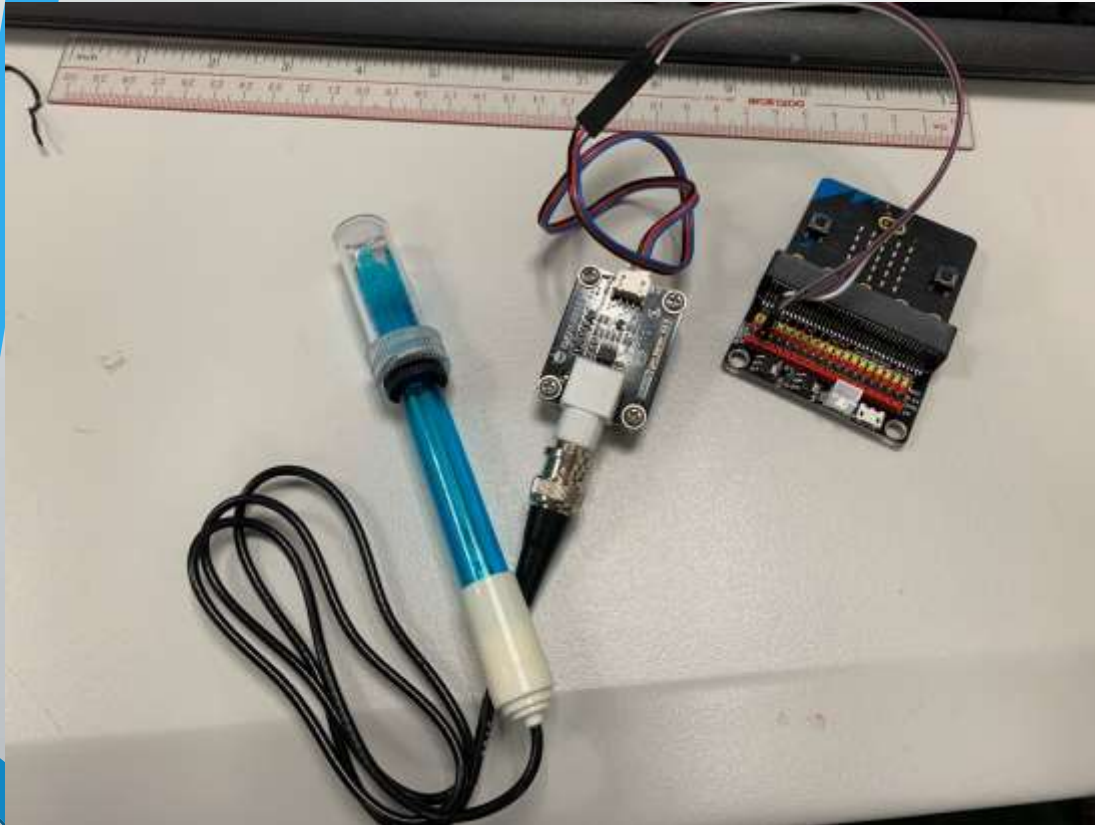
Quantity:

BUY IT NOW

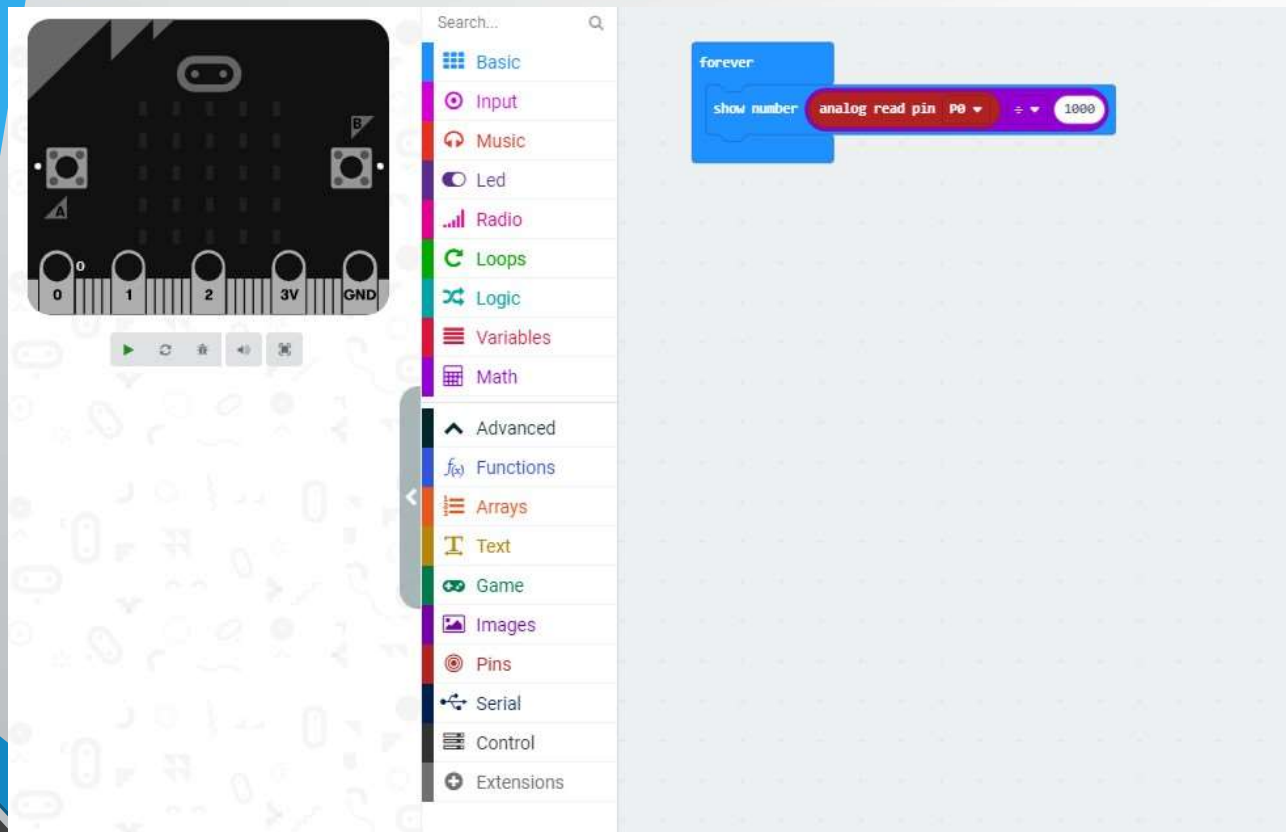
ADD TO CART



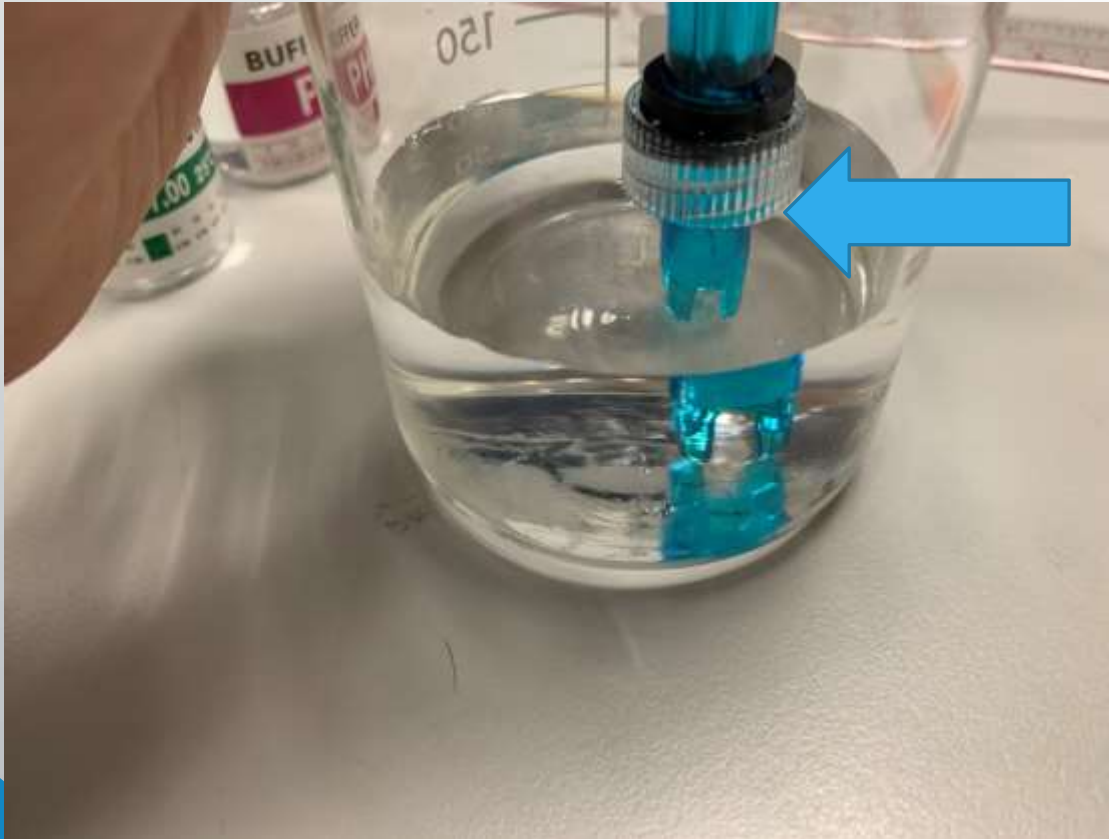
Circuit



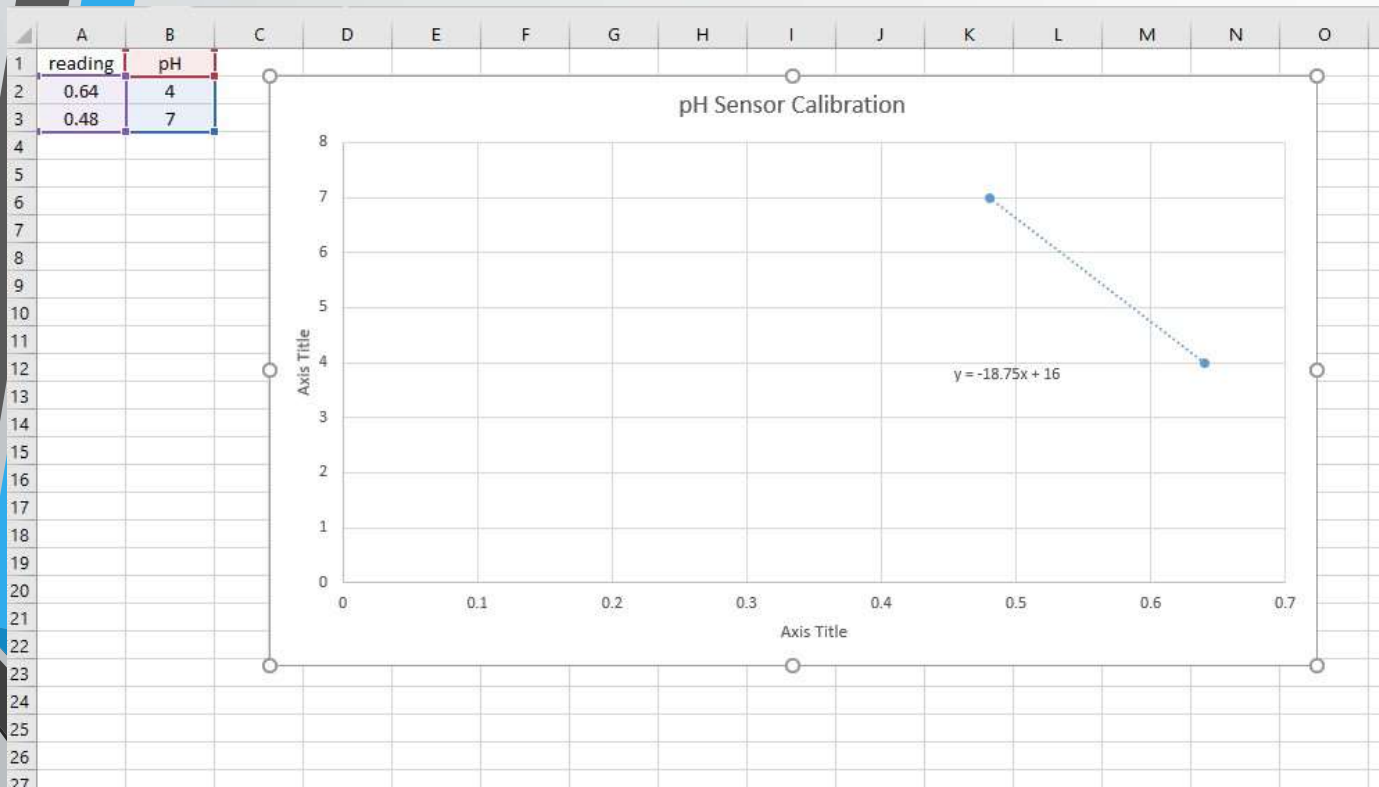
Code1 (For Calibration)



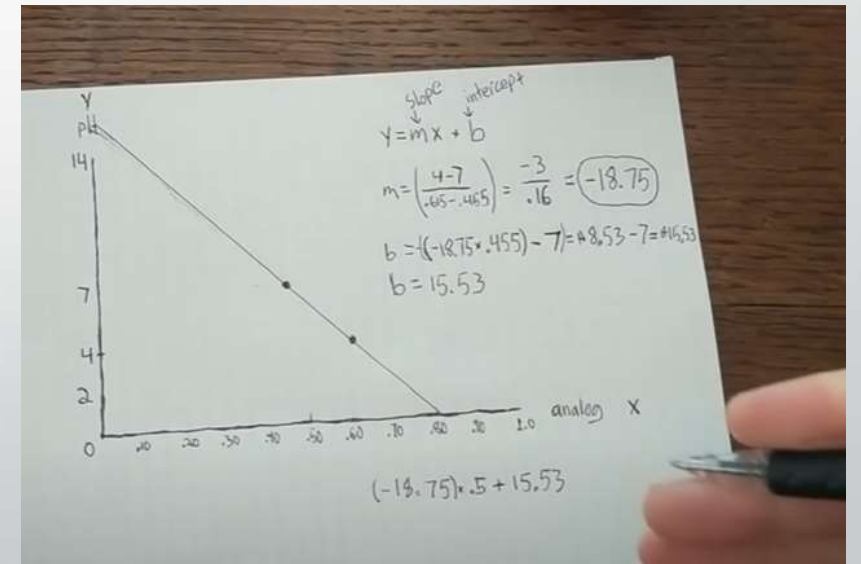
Calibration



Finding m & b

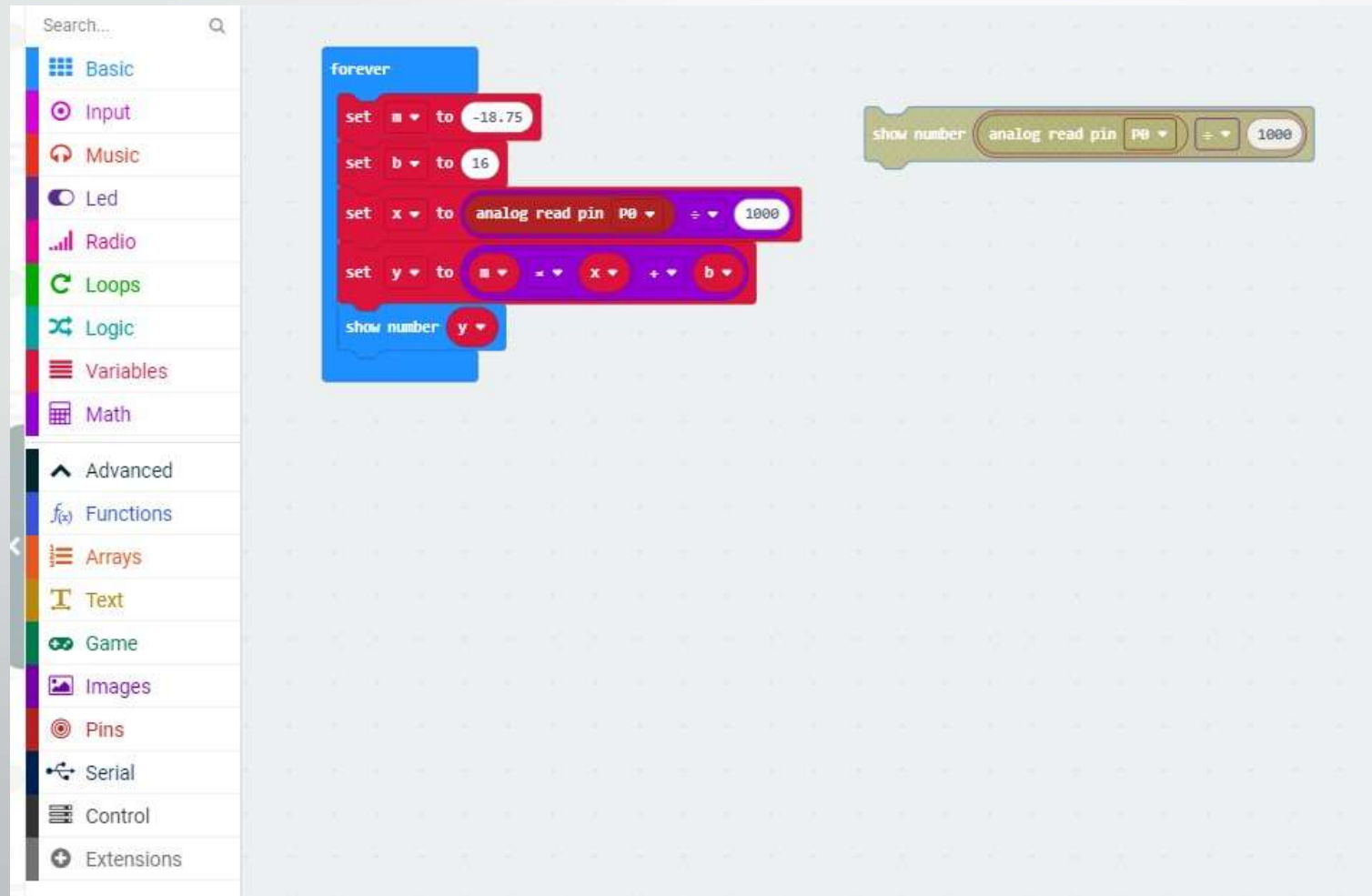


Slope Equation:
 $Y = mx + b$



Code3 (Final)

Slope Equation:
 $Y = mx + b$

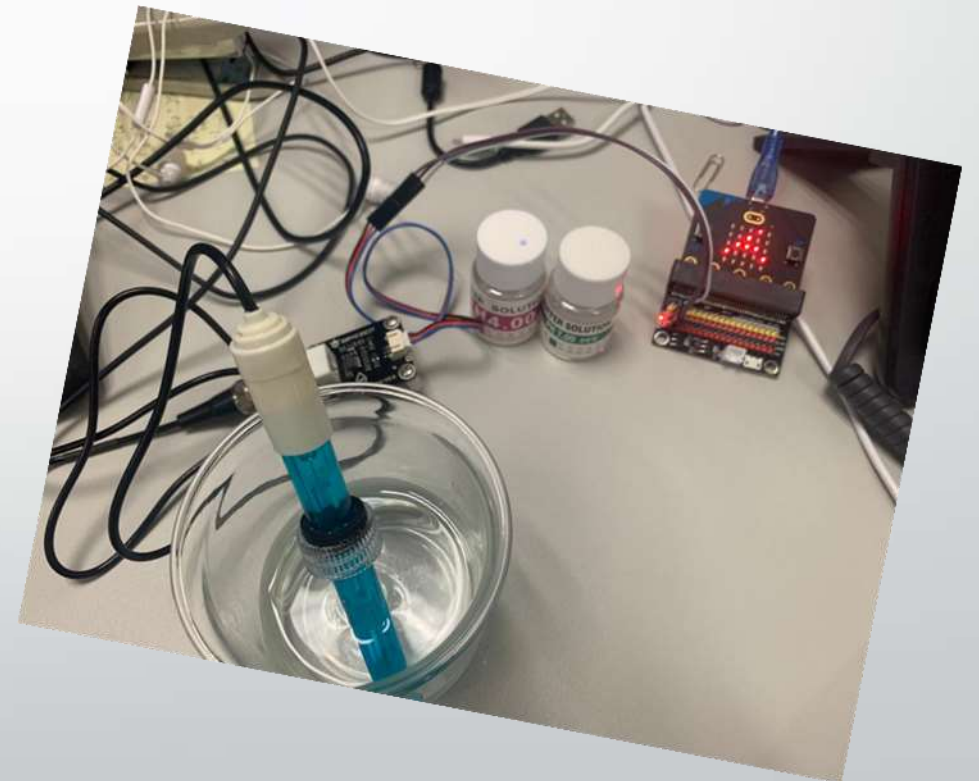


The image shows a Scratch script for calculating the slope equation $Y = mx + b$. The script is as follows:

- forever** loop:
 - set** `m` to `-18.75`
 - set** `b` to `16`
 - set** `x` to `analog read pin P0` $\div$ `1000`
 - set** `y` to `m` $\times$ `x` $+$ `b`
 - show number** `y`
- show number** `analog read pin P0` $\div$ `1000`

Notes for SEN0161-V2

- Wash before using it
- All analog reading in Micro:bit ($\div 1000$)
- 25°C
- Plot graph

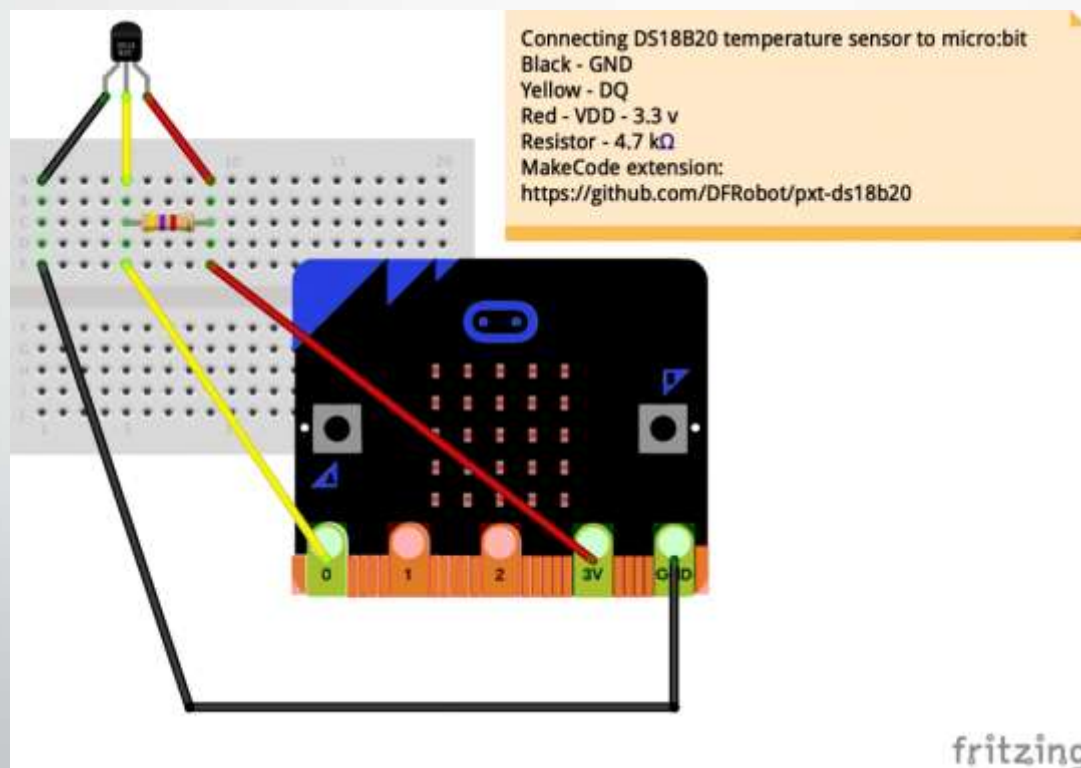


Temperature Sensor DS18B20

4.7k



Circuit

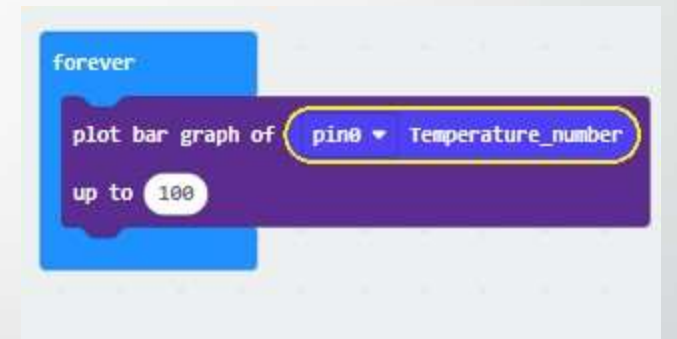
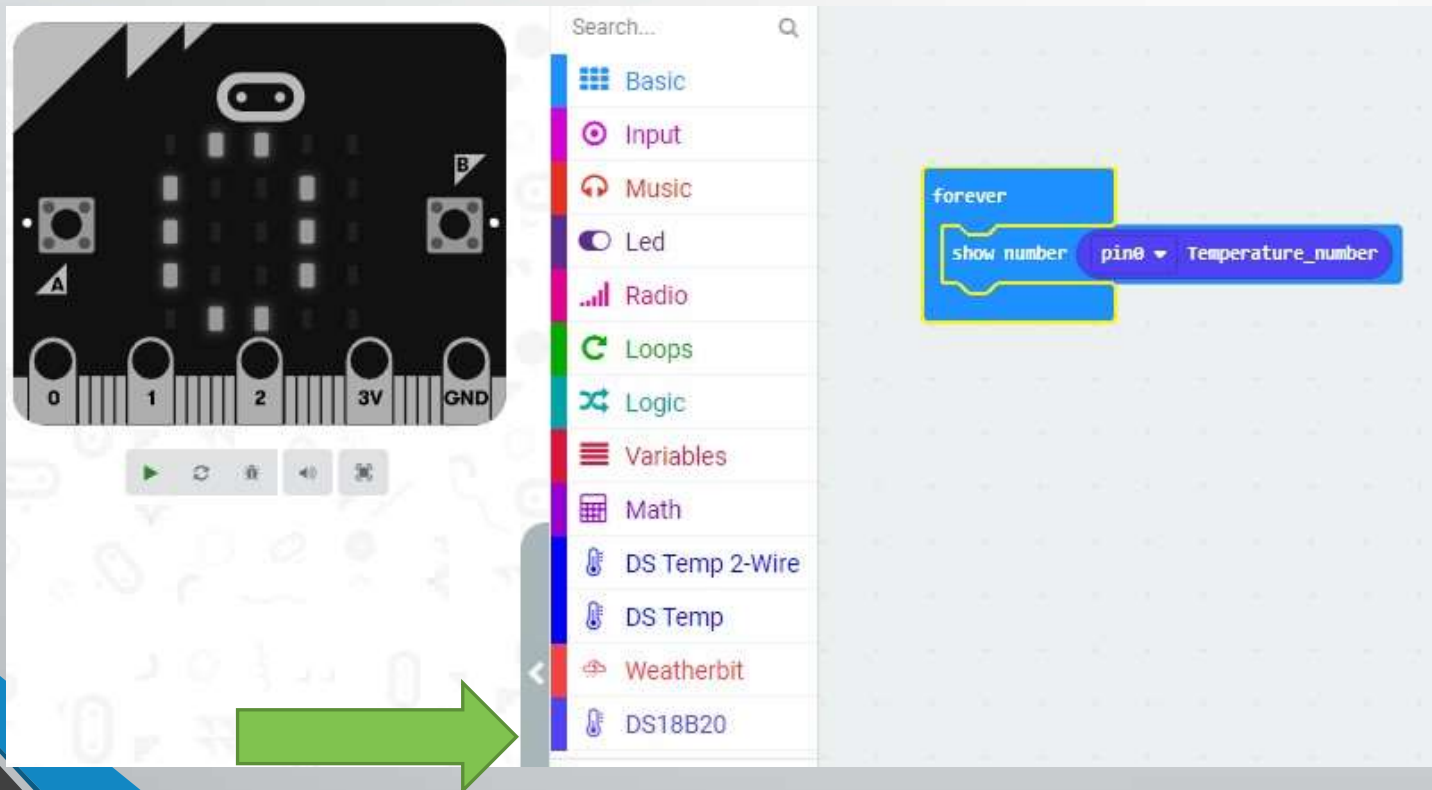


Extension (1)

<https://github.com/DFRobot/pxt-ds18b20>

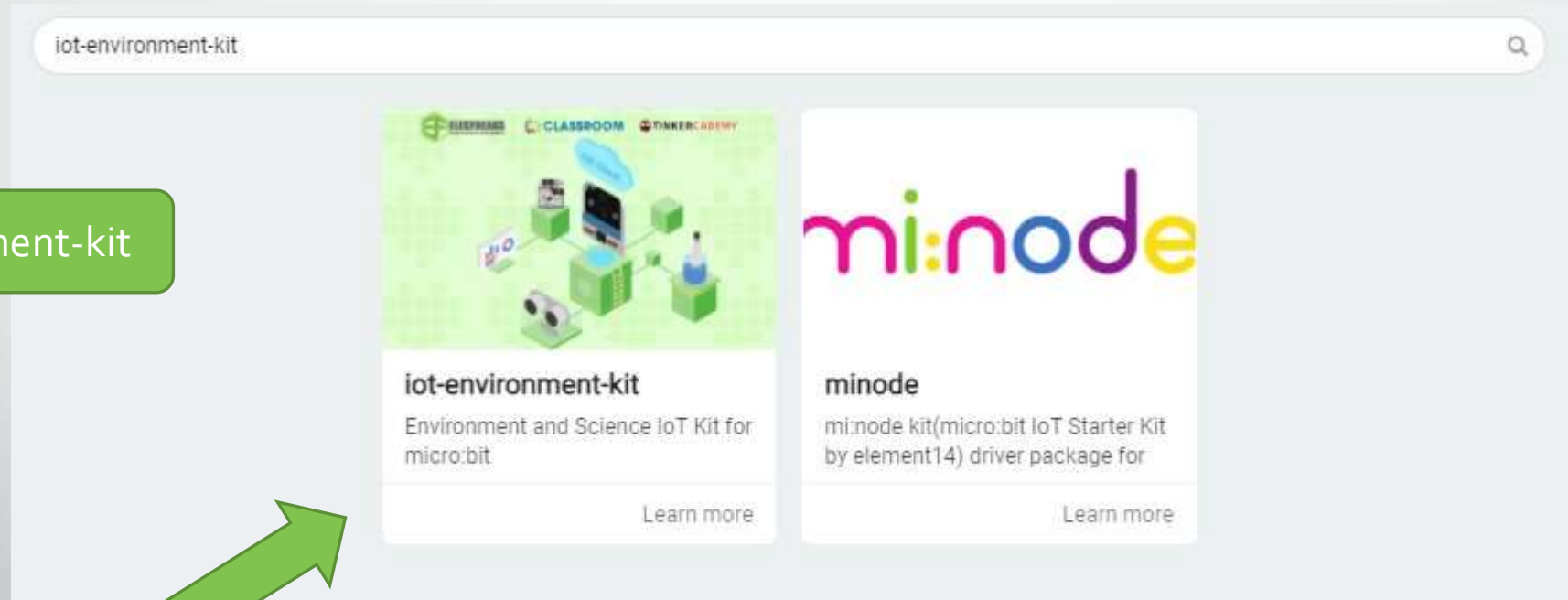


Code (1)

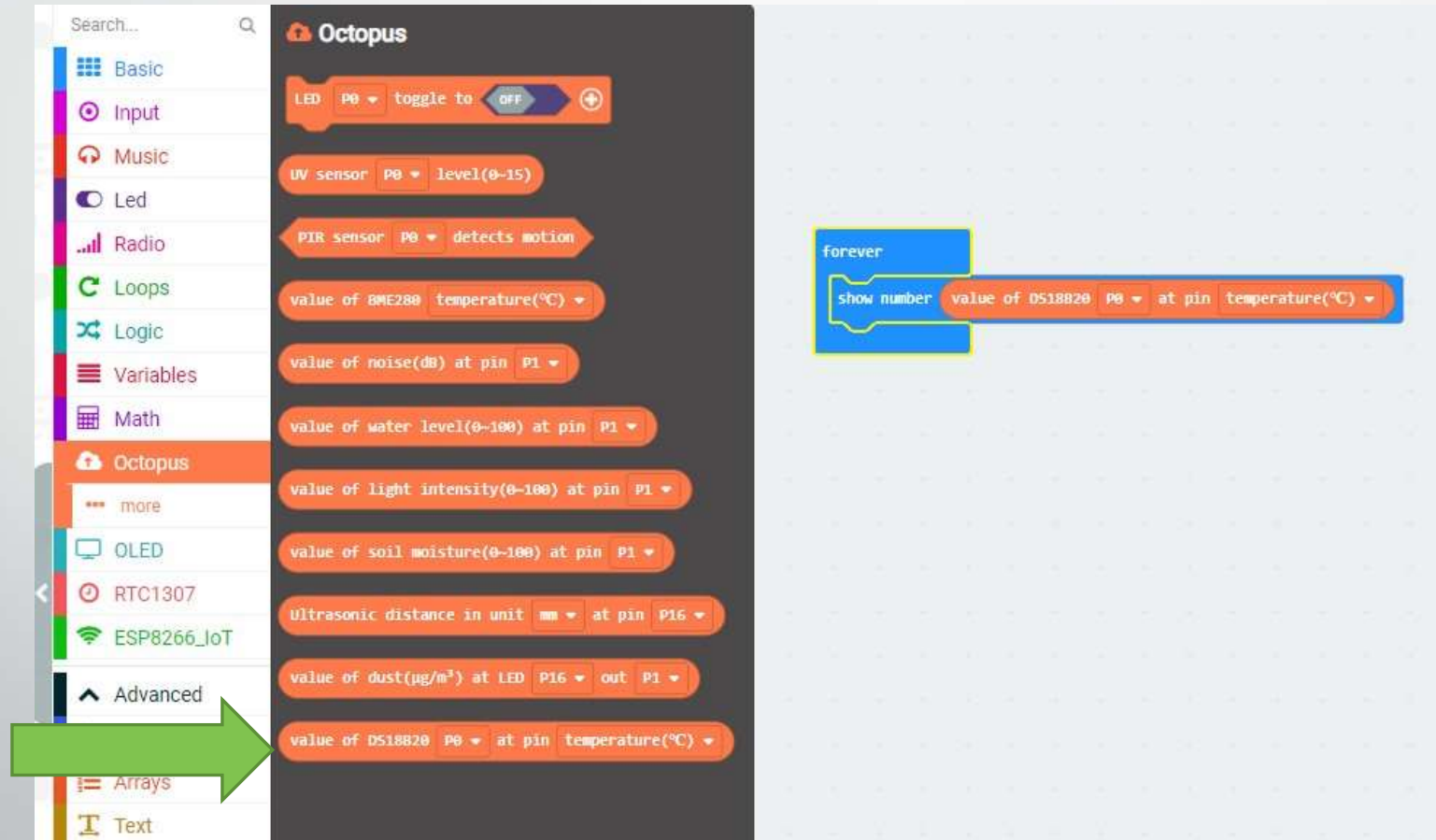


Extension (2)

iot-environment-kit



Code (2)



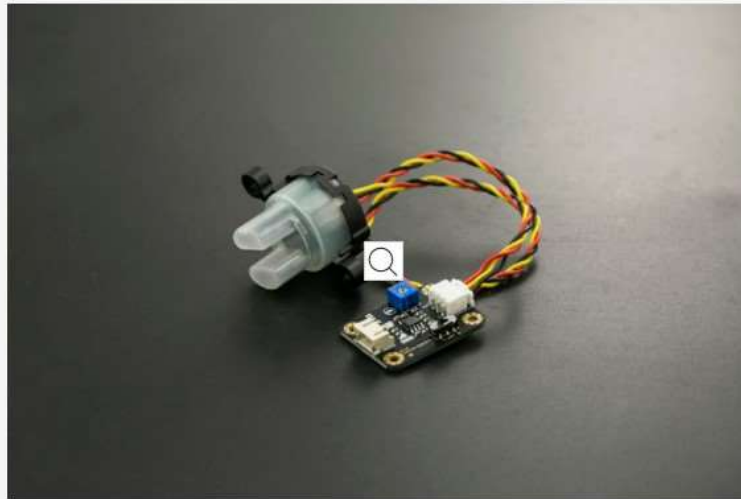
The screenshot displays the Octopus IoT programming environment. On the left, a sidebar lists various components: Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, Octopus (selected), more, OLED, RTC1307, ESP8266_IoT, Advanced, Arrays, and Text. A green arrow points from the 'Advanced' category to the 'Octopus' section in the main workspace.

The main workspace, titled 'Octopus', contains a list of sensor modules: LED, UV sensor, PIR sensor, value of BME280, value of noise, value of water level, value of light intensity, value of soil moisture, ultrasonic distance, value of dust, and value of DS18B20. The 'value of DS18B20' module is highlighted with a yellow border.

On the right, a code block is shown with a 'forever' loop containing a 'show number' block. The 'show number' block is configured to display the 'value of DS18B20' at pin 'P0' with the unit 'temperature(°C)'.

Turbidity (S E N0189)

Sensors / Liquid Sensors / Gravity: Analog Turbidity Sensor For Arduino



Gravity: Analog Turbidity Sensor For Arduino

SKU:SEN0189

Brand:DFRobot

Reward Points: 99

\$9.90

In Stock

Quantity Based Price

Categories: Sensors All Products Liquid Sensors

Topic: Gravity

QTY	DISCOUNT
2-4	\$9.80
5-9	\$9.70
10+	\$9.50

Quantity:

BUY IT NOW

ADD TO CART





More About SEN1089



reb87able · 2 years ago · edited

only two simple questions:

1. within this range 0 to 3000, what is the range of a clear (drinking) water?
2. as the standard of turbidity is 0 to 5, how to can i convert this 0-3000 to 0-5?

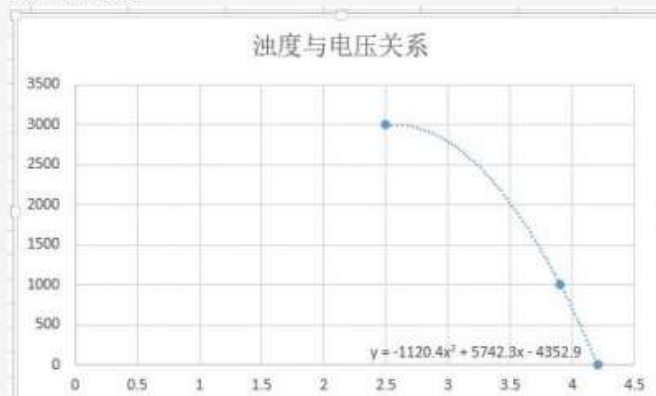
Thank you

4 ^ | v · Reply · Share ›



DFRobot Support **Mod** → reb87able · 2 years ago

1. Because the sensitivity of different sensors is different, I can't get the absolute value about clear water, you can use this sensor to measure the relative turbidity of two solutions.
2. Convert the analog reading (which goes from 0 - 1023) to a voltage (0 - 5V). Please look at the picture below about 0-3000 to 0-5.

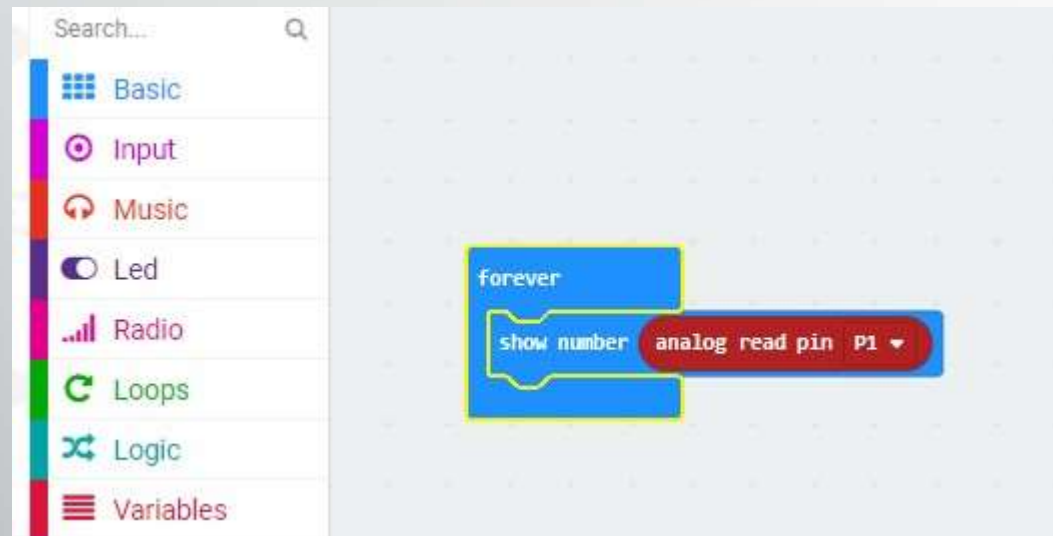


^ | v · Reply · Share ›

Incorrect cable
Unstable readings
Only provide relative readings
Need to re-measure every time
Shortage in supply

<https://www.dfrobot.com/product-1394.html>

Code(1)



Arduino:
 $\text{Reading} * (5/1023)$

Code (2)

Extensions

<https://github.com/kittenbothk/pxt-KittenTurbidity>

KittenTurbidity
KittenBotTurbidity

User-provided extension, not endorsed by Microsoft. Learn more

<https://github.com/kittenbothk/pxt-KittenTurbidity>

Blocks Python

Search...

- Basic
- Input
- Music
- Led
- Radio
- Loops
- Logic
- Variables
- Math
- KittenTurbidity
- Advanced

on start

- set pull pin P0 to up

on button A pressed

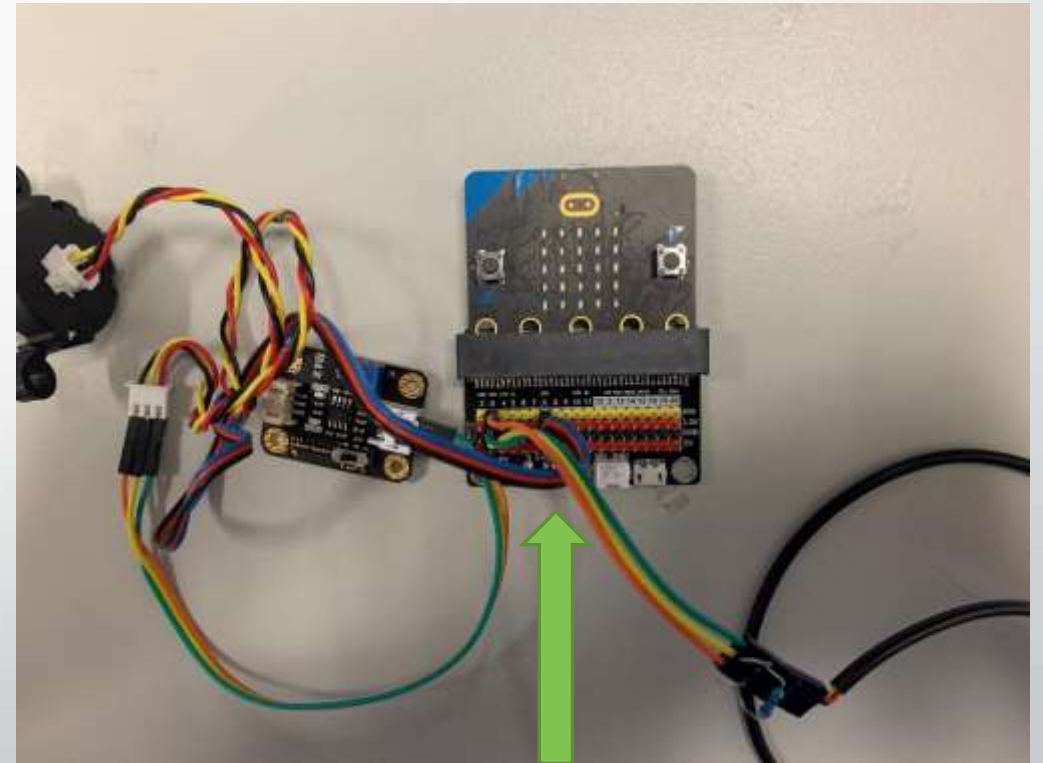
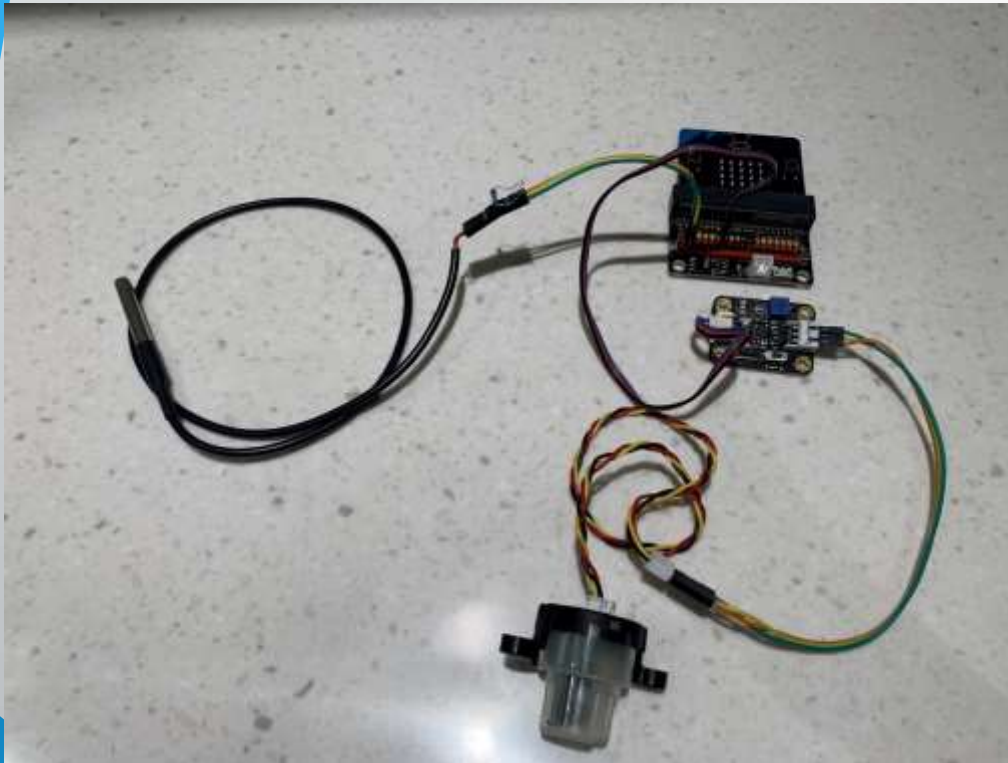
- set x to Get Water Temperature Pin pin0
- show number x
- Calibrate w/ Temp x, Pin P1

on button B pressed

- show number round Get NTU Pin P1

A = Temperature Readings (°C)
B = Turbidity Readings (NTU)

Circuit



P0 =
Temperature(DS 18B20)
P1 = Turbidity(S EN0189)

Pasco PS-2002 Graphing Logger + Pasco Pasport Ps-2122 Turbidimeter



Reference: Results (Pasco)

	Turbidity(NTU)
Water (Tap)	0.8
7up	1.8
Coca Cola	2.2
Coca Cola (No sugar)	10.5
Pocari Sweat	58.8
Milk (fresh)	107.2
Milk (Over 24hrs)	318.1



Dissolved Oxygen SEN0237

- Water Temperature (25°C)
- USD 169 ~ HKD 1315

Sensors / Liquid Sensors / Gravity: Analog Dissolved Oxygen Sensor / Meter Kit For Arduino



Gravity: Analog Dissolved Oxygen Sensor / Meter Kit For Arduino

SKU: SEN0237-A Brand: DFRobot Reward Points: 1690

\$169.00 In Stock

Categories: Sensors All Products Liquid Sensors
Topic: Gravity

* Model:

Quantity:



Nitrate Sensor (Nitrate Ion-Selective Electrode)

- At least USD 280 ~ HKD2179.20+

Nitrate Ion-Selective Electrode

Home > Sensors > Ion-Selective Electrodes > Nitrate Ion-Selective Electrode



Nitrate Ion-Selective Electrode
\$280.00 Ex Works Price

The Nitrate Ion-Selective Electrode (ISE) can be used to measure the concentration of Nitrate (NO_3^-) in aqueous samples.

ORDER CODE: NO3-BTA

  **1**  **ADD TO CART**

Education Level

HIGH SCHOOL **COLLEGE**

Subjects

Chemistry **Environmental Science** **Water Quality**

Reference: Material List(HKD)

- pH Sensor
SEN0161-V2 ~ \$315
- Temperature Sensor
DS18B20 ~\$9
- Turbidity
SEN0189 ~\$77.05
- Dissolved Oxygen
SEN0237 ~\$1315
- Nitrate Sensor
Nitrate Ion-Selective Electrode ~\$2179+

