Mission: Environment Detective - Exploring Our World with micro:bit

Overview

Ever wondered how we can use technology to understand the world around us? In this exciting project, you will become an environmental detective using your micro:bit's built-in superpowers!

Just like our five senses help us explore the world, your micro:bit has special sensors that can tell you:

- How warm or cold it is using its temperature sensor
- How bright or dark it is using its light sensor
- Which direction you're facing using its compass

> NOTE
> You do not need a micro:bit to do this tutorial you can use the simulator built into the MakeCode editor.

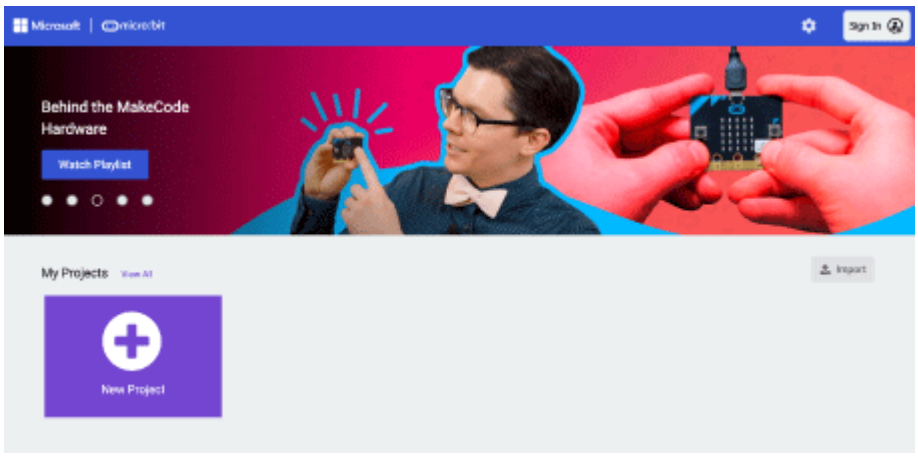
What you Will Learn

- [ ] Display temperature readings
- [ ] Create a light meter that reacts to brightness
- [ ] Build a digital compass to find your way

Are you ready to start exploring? Let's begin our environmental adventure!

Navigating to MakeCode

1. Open your favourite browser (we recommend Google Chrome) or if you are using a mobile phone or tablet open the micro:bit app.
2. Within the address bar of the browser type makecode.microbit.org or on a tablet or phone press create code.



3. Select **New Project** and give it the name **Environment Detective**.

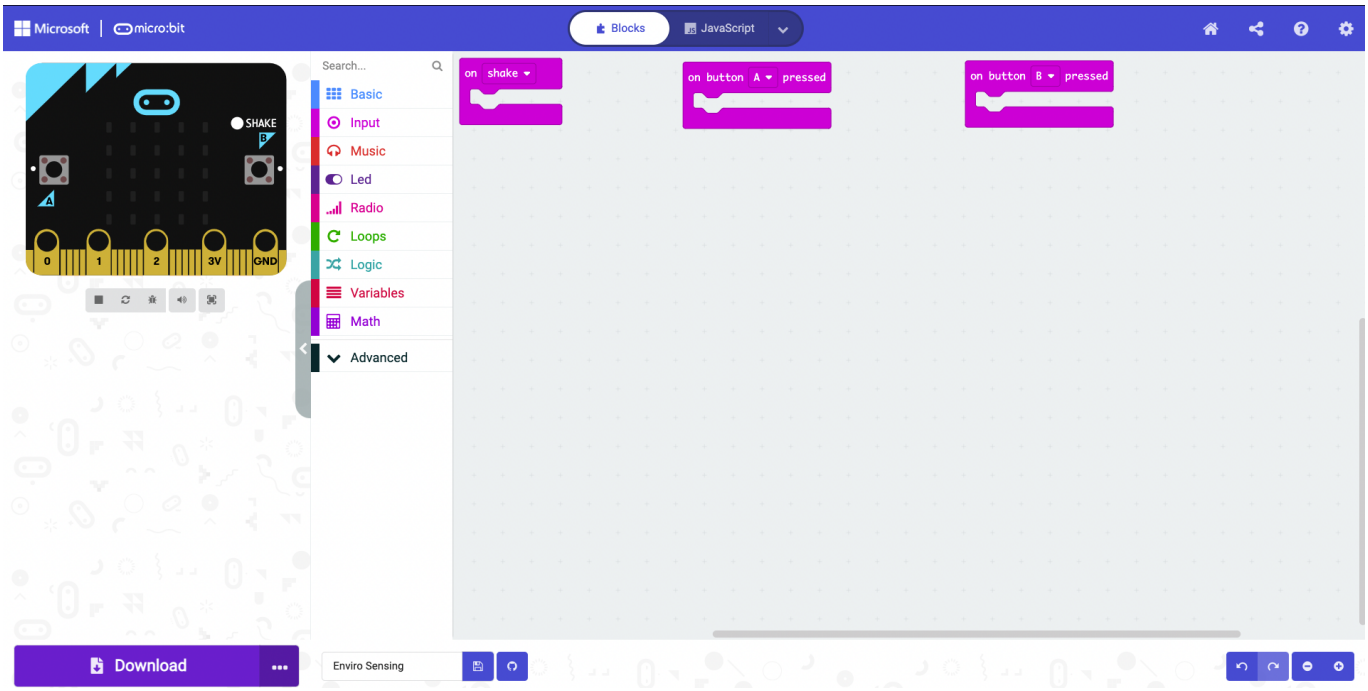
We are now ready to start coding!

Coding

Setting up the Code Area

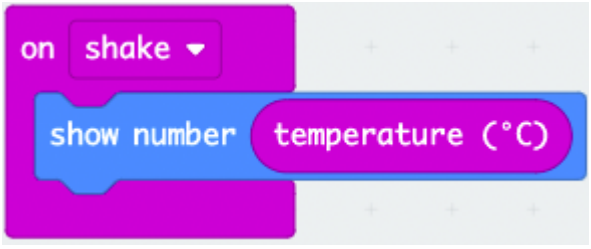
1. Select and drag the `on start` block to the left of the screen and **drop it** on the **bin**.
2. Select and drag the `forever` block to the left of the screen and **drop it** on the **bin**.
3. From the Input menu, select and drag the `on shake` block to the code area and drop it.
4. From the Input menu, select and drag a `on button A pressed` block to the code area and drop it.
5. Right-click on the `on button A pressed` block and select **duplicate**.On the duplicated block select the **little arrow** next to **A** and choose **B**.

Your code area will now look like this:



Temperature Sensing

1. From the Basic menu, select and drag a `show number` block to the code area and attach it within the `on shake` block.
2. From the Input menu, select and drag a `temperature` block to the code area and attach it within the **0** of the `show number` block.

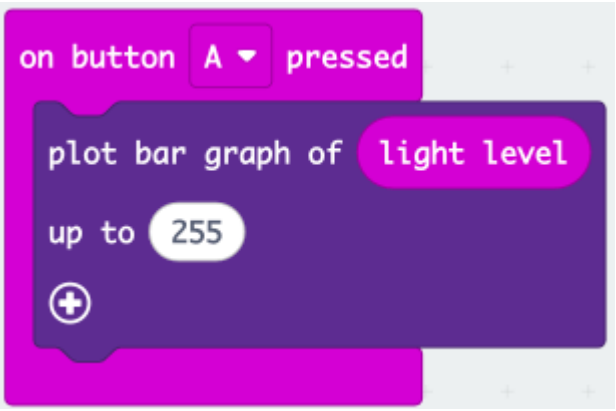


We can now sense the temperature around us.

Light Sensing

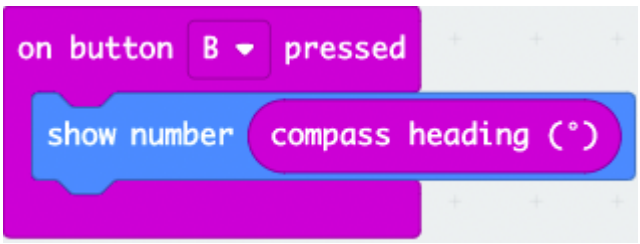
1. From the Led menu, select and drag a `plot bar graph of` block to the code area and attach it within the `on button A pressed` block.
2. From the Input menu, select and drag a `light level` block to the code area and attach it within the **0** of the `plot bar graph of` block.
3. Type **255** within the **0** of the `up to`line.

This will plot a graph on the LED matrix of the amount of light in your environment when the A button is pressed.



Compass Sensing

1. From the Basic menu, select and drag a `show number` block to the code area and attach it within the `on button B` pressed.
2. From the Input menu, select and drag the `compass heading` block to the code area and attach it within the **0** of `show number`.



Completed Code

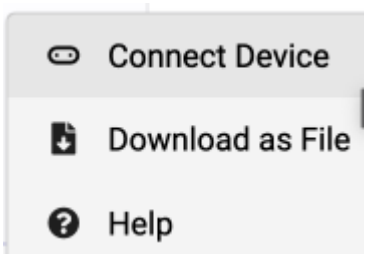
Here is what our completed code looks like:

We are now ready to download the code to our micro:bit so we can go out and sense our environment.

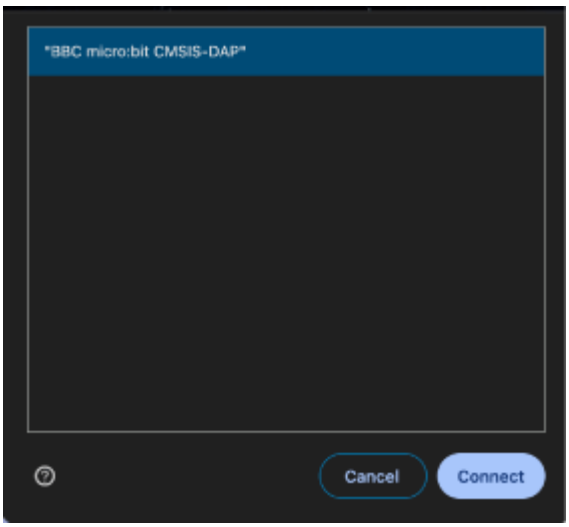
Downloading the code to the micro:bit

1. Select the **3 dots** next to **Download**.

2. Select **pair device** a pop-up will come on screen to show you how to connect the micro:bit to the computer. Select **pair device** again.



3. Select **BBC micro:bit xxxx** and Select **connect**.



4. Select Download.

Now that we have downloaded our code, let's find out how to play.

How to Play

Now that we have the completed code we can test it out.

Web Browser

Temperature Sensing

Within the micro:bit simulator we can move the micro:bit around to simulate a shake or select the circle next to the **shake** text. This will display the temperature on the screen.

You will also see a slider with a temperature reading next to it. We can move this up or down to set our temperature.

Light Sensing

Select the **A** button to show the amount of light being detected. Above the A button you will see a circle appear. You can drag the yellow part up and down to adjust the light level and when the A button is pressed it will be depicted on the LED matrix.

Compass Sensing

To see what direction you are facing select the **B** button. A number of degrees will scroll across the LED matrix. To change the compass value move the micro:bit logo around (looks like two eyes).

Using the micro:bit

Temperature Sensing

Shake the micro:bit to get the temperature reading to show on screen.

Light Sensing

Press the A button to get a light level reading

Compass Sensing

Press the B button to get a reading from the compass.

> NOTE
> If you are using the compass for the first time, you will get a message to move the micro:bit around to light every LED up on the LED matrix. This is to calibrate the micro:bit to get an accurate as possible compass reading.

Now go around different room/outdoors to see the difference in temperature and light level.