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

What you will Learn

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

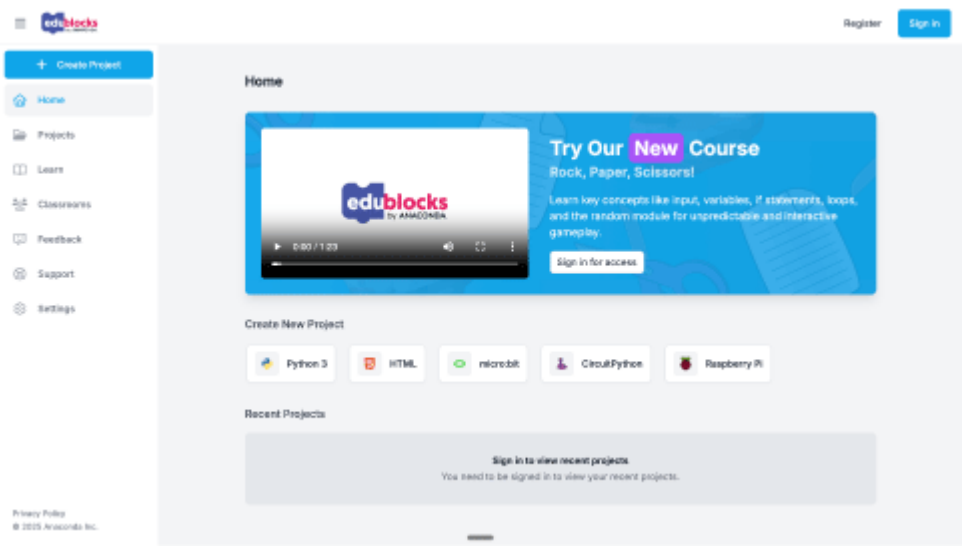
What you will Need

- 1 x micro:bit
- 1 x micro USB cable
- 1 x battery pack for the micro:bit (optional)

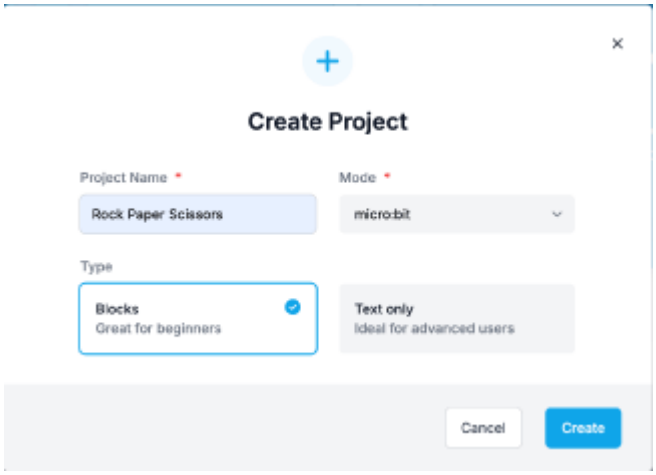
Are you ready to start exploring? Let's begin our environmental adventure!

Navigating to EduBlocks

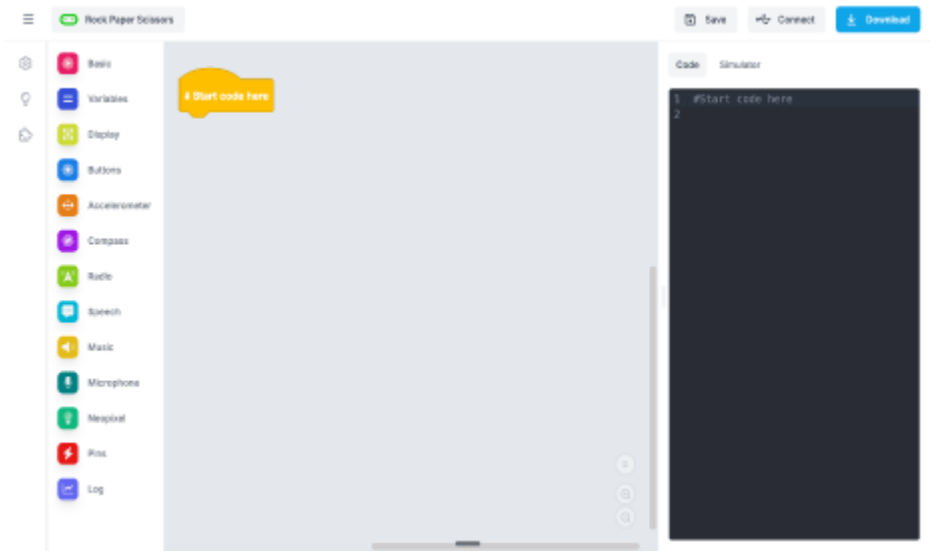
1. Open your favourite browser (we recommend Google Chrome).
2. Within the address bar of the browser type app.edublocks.org or on a tablet or phone press create code.



3. Select micro:bit under **Create New Project** to open the micro:bit coding editor. Name your project **Enviro Sensing** and make sure you have **Blocks** selected under **Type**. See the image below.



4. Select **Create** to open the micro:bit editor.



We are now ready to start coding!

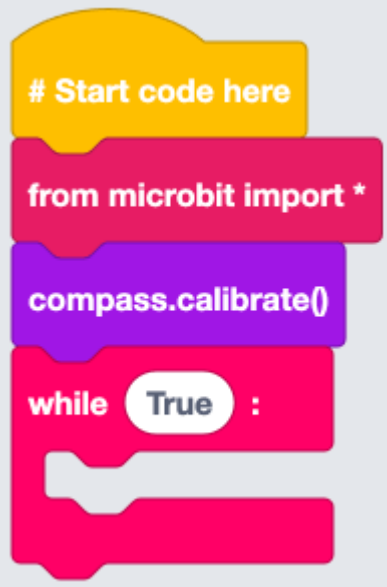
Coding

Setting Up the Code Area

1. From Imports within the Basic menu, select and drag a `from microbit import *` block to the coding area and connect it under the `# start code here` block.

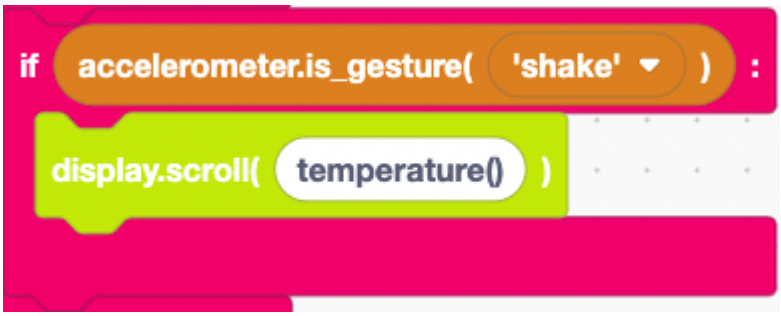
2. From Loops within the Basic menu, select and drag a `while True:` block to the code area and attach it under `from microbit import *` block.

3. From the Compass menu, select and drag a `compass.calibrate()` block to the code area and attach it below the `from microbit import *` block.



Temperature Sensing

1. From Logic within the Basic menu, select and drag an `if True:` block to the code area and attach it within the `while True:` block.
2. From the Accelerometer menu, select and drag an `accelerometer.is_gesture('shake')` block to the code area and attach it within the **True** of the `if` block.
3. From the Display menu, select and drag a `display.scroll(0)` block to the code area and attach it within the `if accelerometer.is_gesture('shake'):` block.
4. Change the **0** of the `display.scroll` block and type **temperature()**.

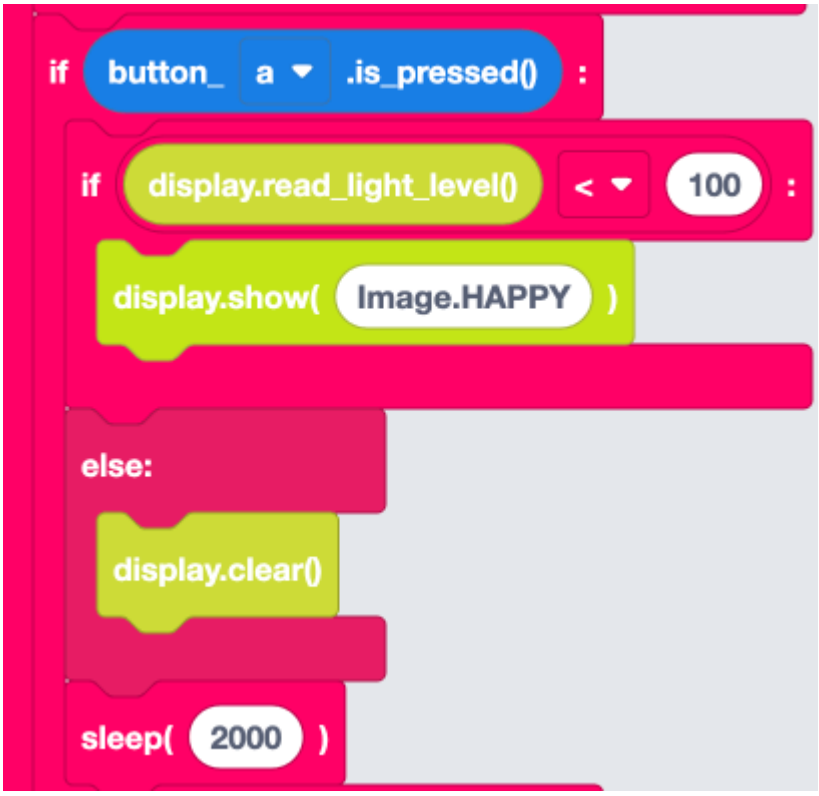


We can now sense the temperature of the room you are in by shaking the micro:bit.

Light Sensing

1. From Logic within the Basic menu, select and drag an `if True:` block to the code area and attach it under the `if accelerometer.is_gesture('shake'):` block.
2. From the Buttons menu, select and drag a `button_a.is_pressed()` block to the code area and attach it within the **True** of the `if` block.
3. From Logic within the Basic menu, select and drag an `if True():` block to the code area and attach it within the `if button_a.is_pressed():` block.

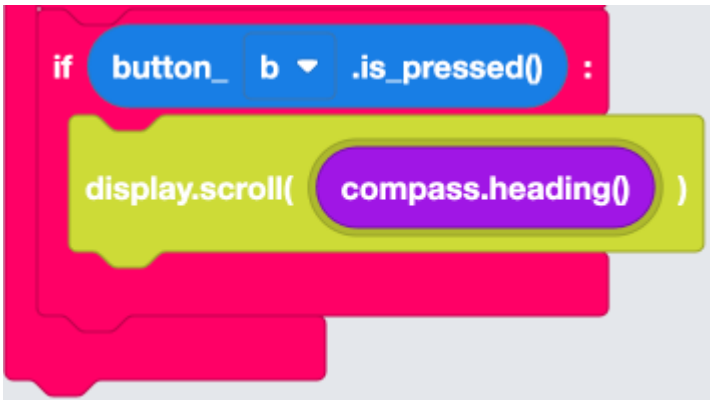
4. From Logic within the Basic menu, select and drag a `0 = 0` block to the code area and attach it within the **True** of the `if` block. Select the **=** and choose **<**.



We can now use the micro:bit to detect if it's light or dark within a room by pressing the A button on the micro:bit.

Compass Sensing

1. From Logic within the Basic menu, select and drag an `if True:` block to the code area and attach it under `if button_a.is_pressed():` block.
2. Right-click on `button_a.is_pressed()` block and select **duplicate**. Attach the duplicated block within the **True** of the `if` block. select **a** and choose **b**.
3. From the Display menu, select and drag a `display.scroll("Hello World")` block to the code area and attach it within the `if button_b.is_pressed():` block.
4. From the Compass menu, select and drag a `compass.heading()` block to the code area and attach it within **Hello World** of the `display.scroll` block.



We can now see what the compass baring of the direction the micro:bit is facing by pressing the B button on the micro:bit.

Completed Code

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. Take the micro USB cable and connect the micro:bit to the computer.
2. Select **Connect** and follow the pop-ups on screen to pair the micro:bit to the web browser.
3. Select the **Download** button to download your code to the micro:bit.

How to Play

Using the micro:bit

When the micro:bit first starts we will need to calibrate the compass by lighting up all the LEDs on the matrix.

Shake the micro:bit to display the temperature on the LED matrix.

Press the A button to read the light level. You will see a smiley face if in low light and the LED matrix will remain blank if the light level is high.

Press the B button to display the compass reading. This will be in degrees.