

Activity: Make your own water sensor

In our micro:bit: Mission to Mars Live Lesson, we'll be exploring different ways you can use the BBC micro:bit to test and understand your environment.

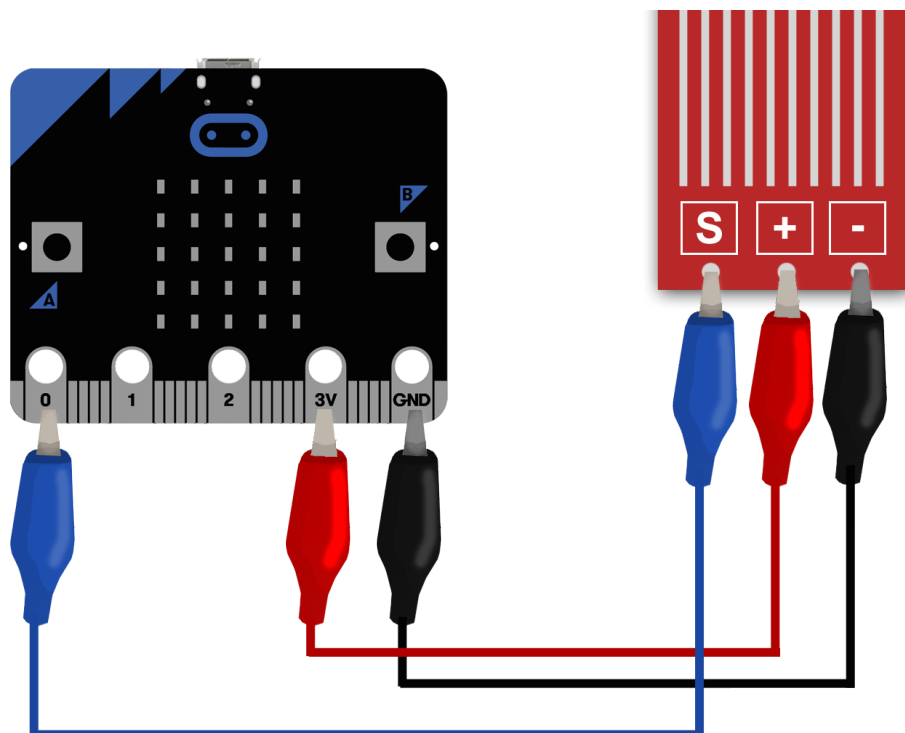
In this follow-up activity, you can learn how to create your very own water sensor, which you can use to monitor water levels in your home.

Components needed:

- BBC micro:bit
- Micro USB cable for programming the BBC micro:bit
- 2AAA battery pack for the BBC micro:bit
- 2 x AAA batteries
- Analog water sensor module (available from a variety of sellers)
- Three wires with crocodile clips

Step 1: Creating your circuit

The circuit for the sensor is very simple. On the water sensor module you'll find three pins, labelled positive (+), negative (-) and signal (s).



Using the crocodile clips and wires, connect the negative (-) pin on the sensor to GND on the BBC micro:bit, the positive (+) pin on the sensor to 3V and the signal (s) pin to Pin 0, 1 or 2. Here, we've used Pin 0.

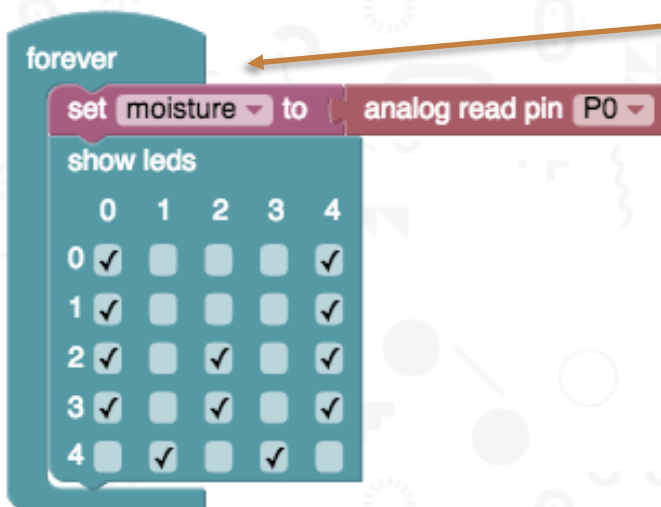
Step 2: Import the code

Click on the hex file link on the Live Lessons website to view the code on the BBC micro:bit website.

The script for your water sensor should now appear in your code window.

Hit 'run' to see it in action on the simulator, or plug in your BBC micro:bit, hit 'compile' and drag the hex file onto your BBC micro:bit. Press button B to test if your sensor is wet or dry.

Step 3: Understanding the code

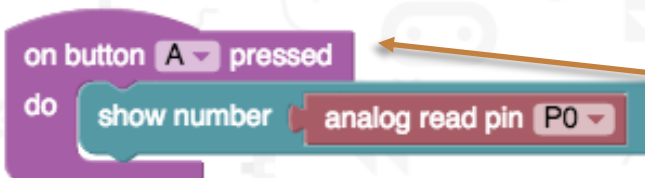


Initialising the program

Here we've introduced a **loop** that goes on **forever**, which means that whatever is in this loop keeps happening unless something else in the program interrupts it.

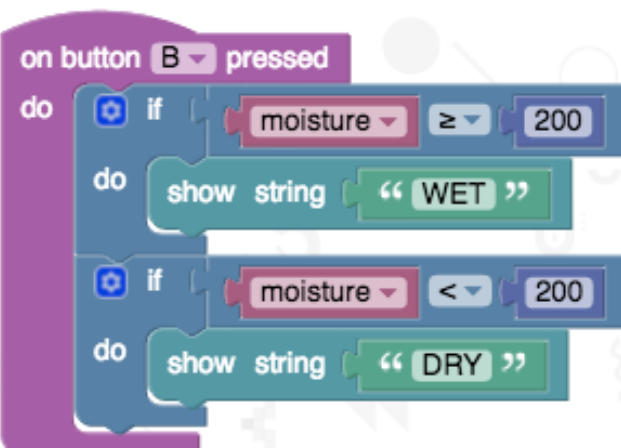
We've set up a **variable** called **moisture**, and stated that the value of **moisture** is the value that's read by Pin 0 (the pin that the water sensor is connected to).

Just to show that the BBC micro:bit is up and running, we've also programmed the LEDs to display a 'W', for water.



Displaying the reading

Here, we've said that when button A is pressed, the LEDs on the BBC micro:bit display the value being read by the sensor.



Testing for water

To make it even easier to understand, we've programmed button B to simply show whether the sensor is wet or dry. Here we've said that when button B is pressed, the program performs two tests to see if conditions are met.

We have two conditional statements:

- if the value of **moisture** is more than or equals to 200, it displays the message, or string, WET
- if the value of **moisture** is less than 200, it displays the message, or string, DRY.

Step 4: Test and play

Now that you understand the code, you can adapt it to suit your purposes. Why not place it in a plant pot to see if your plants are getting enough water?

You can adjust the values for what constitutes 'WET' or 'DRY' by adjusting the numbers in the conditional statements. If the environment you're testing is generally wetter, you can increase the values, or if you're trying to pick up even the smallest bit of moisture, decrease the values.