Activity: Make your own temperature 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 temperature sensor, which you can use to monitor heat 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
- 1 x TMP36 temperature sensor
- Three wires with crocodile clips

Step 1: Creating your circuit
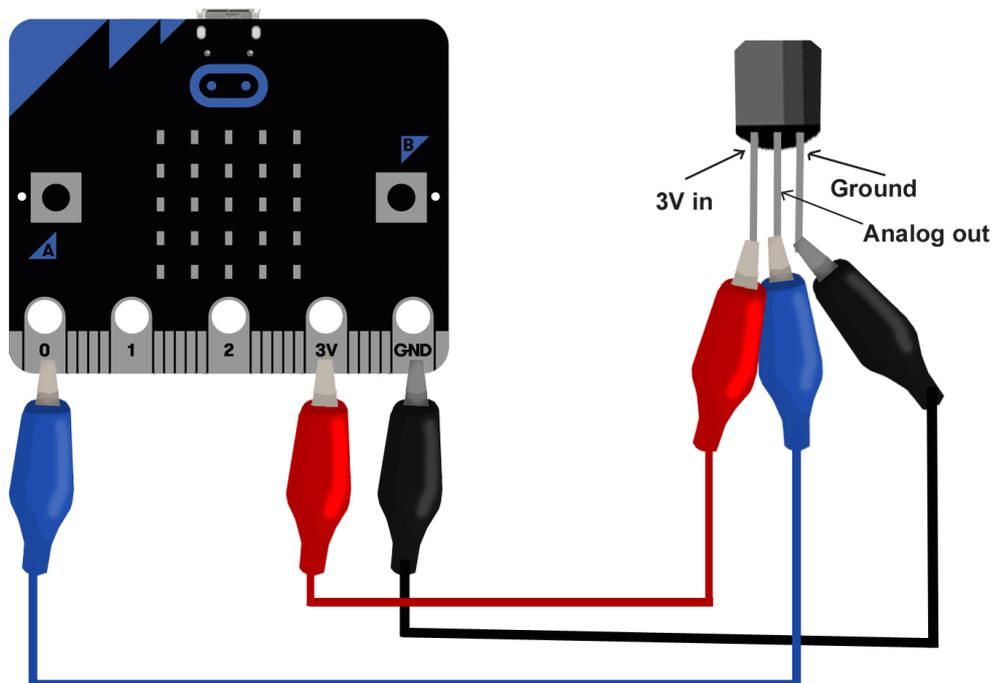
You'll find three legs coming off the temperature sensor. With the flat side of the sensor facing you, connect the left-most leg using crocodile clips and wires to the 3V pin on the BBC micro:bit, the right-most leg to GND, and the middle leg to one of the I/O pins. Here we've used Pin 0.

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 temperature 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 how cool or hot your environment is – you'll see the words 'HOT', 'NICE' or 'CHILLY' scroll across the screen.

Step 3: Understanding the code
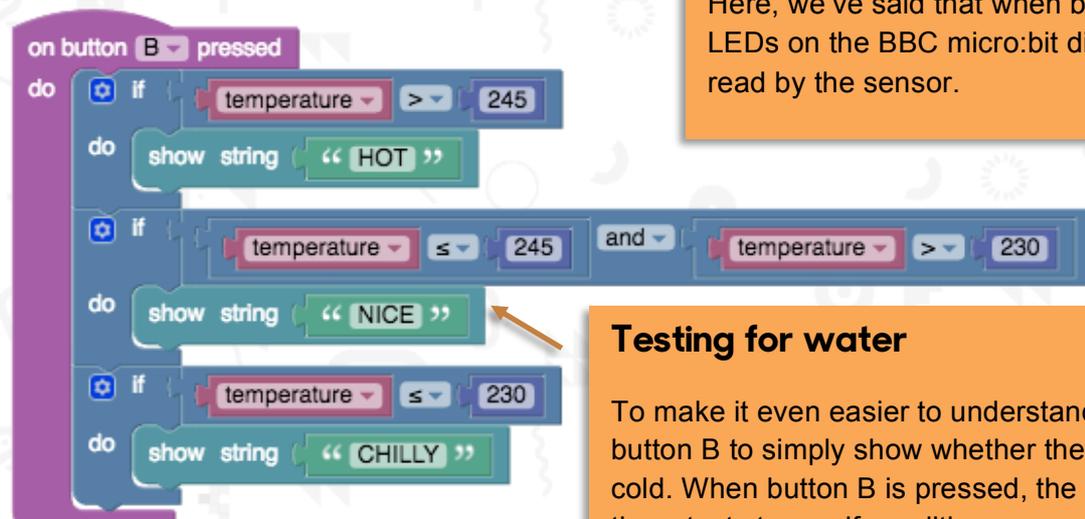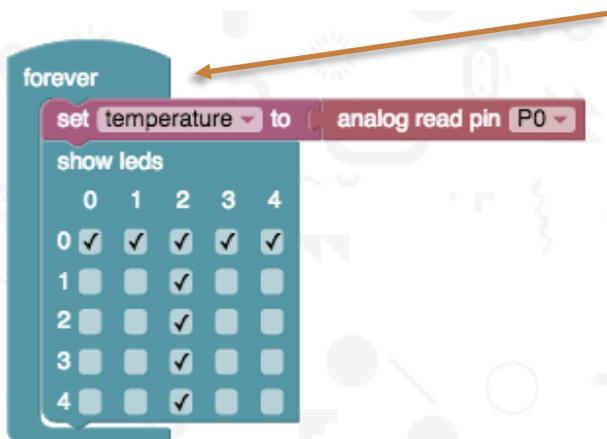
Initialising the program

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 **temperature**, and stated that the value of **temperature** is the value that's read by Pin 0 (the pin that the temperature 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 'T', for temperature.

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 environment is hot or cold. When button B is pressed, the program performs three tests to see if conditions are met:

- if the value of **temperature** is more than 245, it displays the message HOT
- if the value of **temperature** is less than or equals to 245 and more than 230, it displays the message NICE.
- If the value of temperature is less than or equals to 230, it displays the message CHILLY.

Step 4: Test and play

Now that you understand the code, you can adapt it to suit your purposes.

A simple thing to experiment with is changing the message that your BBC micro:bit displays. Simply click on the block with the message and change it to whatever you like.

You can also adjust the values for what constitutes 'HOT', 'NICE' or 'CHILLY' by adjusting the numbers in the conditional statements.