

Activity: Make your own light sensor

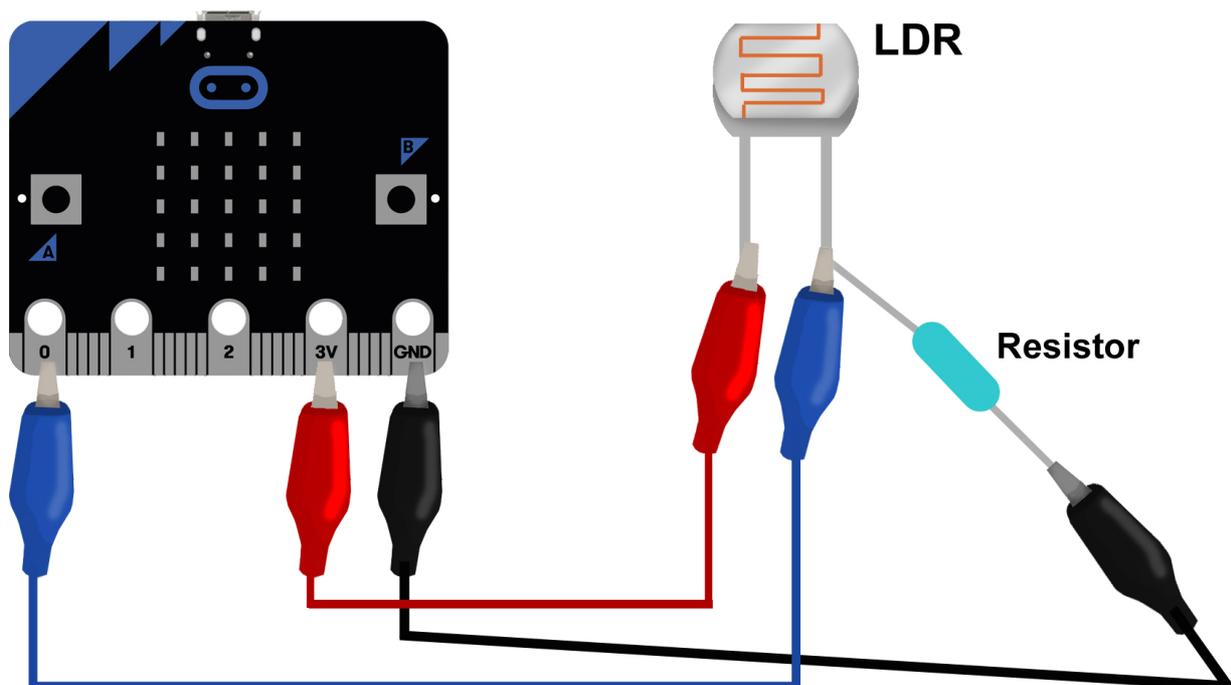
In our micro:bit: Mission to Mars Live Lesson, we'll be exploring different ways you can use the BBC micro:bit to test and understand your environment.

In this follow-up activity, you can learn how to create your very own light sensor, which you can use to monitor light 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 Miniature Light Dependent Resistor (LDR)
- 1 x 10k Ω resistor.
- Three wires with crocodile clips

Step 1: Creating your circuit



You'll find two legs coming off the LDR. Using the crocodile clips and wires, connect one leg to 3V on the BBC micro:bit and the other leg to one of the I/O pins on the BBC micro:bit. Here we've used Pin 0.

Attach a resistor to the leg connected to Pin 0 using the crocodile clip. Attach another crocodile clip and wire to the other end of the resistor, and connect it to GND on the BBC micro:bit. Your circuit is now complete.

Step 2: Import the code

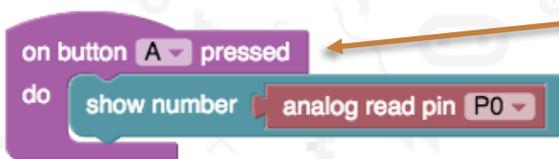
Click on the hex file link on the Live Lessons website to view the code on the BBC micro:bit website.

The script for your light 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.

Depending on how bright your environment is, you should immediately see the words 'DARK', 'FAIRLY BRIGHT' or 'BLINDINGLY BRIGHT' scrolling across your screen.

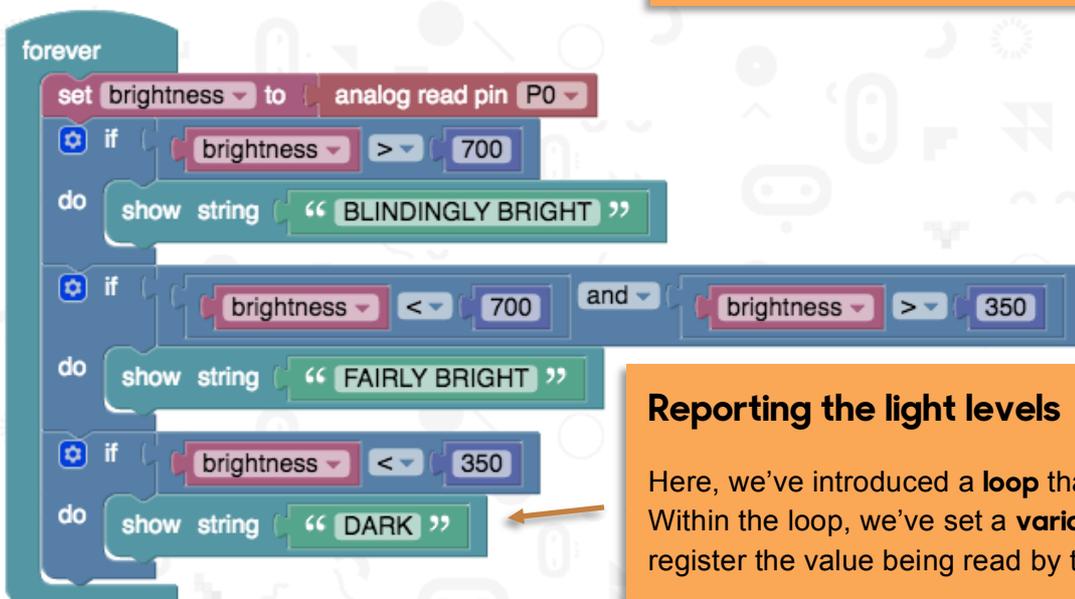
Step 3: Understanding the code



```
on button A pressed
do
  show number analog read pin P0
```

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.



```
forever
  set brightness to analog read pin P0
  if brightness > 700
  do
    show string "BLINDINGLY BRIGHT"
  if brightness < 700 and brightness > 350
  do
    show string "FAIRLY BRIGHT"
  if brightness < 350
  do
    show string "DARK"
```

Reporting the light levels

Here, we've introduced a **loop** that goes on **forever**. Within the loop, we've set a **variable** called **brightness** to register the value being read by the sensor.

We then introduce a few conditional statements:

- If **brightness** is more than 700, then the LEDs display the message 'BLINDINGLY BRIGHT'
- If **brightness** is under 700 and over 350, then the LEDs display the message 'FAIRLY BRIGHT'
- If **brightness** is more than 350, then the LEDs display the message 'DARK'

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 'DARK', 'FAIRLY BRIGHT' or 'BLINDINGLY BRIGHT' by adjusting the numbers in the conditional statements.

If the environment you're testing is generally brighter, you can increase the values, or if you're trying to pick up even the smallest bit of light, decrease the values.