# Lesson 16 – Activity Sheet

# Getting Started

The micro:bit **LED**s can be used to estimate the amount of light that is present in an environment. Take the micro:bit outside on a sunny day and it should read and return the maximum amount of light. Take the micro:bit indoors and the reading will reduce. Cover the LEDs with your hand or a piece of card and the light reading will drop to near zero.

Load up the micro:python editor and copy out the program below. Download it to your micro:bit. It takes a light reading and stores the value in a variable called *light*. The value is then displayed across the LEDs. Press the reset button to take another reading, however this time place you hand over the LEDs. You should get a lower reading.

from microbit import \*

light = display.read\_light\_level()

display.scroll(light)

## **What the Readings Mean**

Can you work out what the maximum and then minimum light readings are? The minimum is easy as it is basically no light. Try setting the light level, using your hand or paper so that you get the following readings:

150, 30, 10, 200

**A Real Time Light Reader**

Now we can create a real time light sensor that takes readings in real time and returns the value. You no longer need to press the reset button. Copy out the program below and download it to your micro:bit:

from microbit import \*

from time import sleep

while True:

light = display.read\_light\_level()

display.scroll(light)

sleep(5)

Adjust the sleep time to make the program respond quicker if required.

## **Adapt the Program so That It Responds to Different Light Levels**

Next adapt the program so that it responds to different light levels. In the example below the program checks if the light value is greater than 200, if it is then it displays a smiley face. If the value is less than 20, then it displays a sad face. Add additional eliflines of code two build up more responses. Download the program to your micro:bit and test it:

from microbit import \*

from time import sleep

while True:

light = display.read\_light\_level()

if light > 20:

display.show(Image.HAPPY)

else:

display.show(Image.SAD)

## Success Criteria

* Create a program that takes light level readings
* Edit the program to respond to take at least two different light level values
* Edit the program to respond to take at least four or more different light level values
* Provide feedback based on the light level values, such as an image, sound or text

## Pro-tip

The level of light will depend on where the micro:bit is. For example, a classroom with little natural light may return readings of 30 to 40. Being outside should return a reading of 255 but, remember to account for cloud coverage and shadow. When you are creating your program ensure that the responses are suitable for your location.

## Test Time

Download the program codes to your micro:bit and then add the batteries. Walk outside into the sunshine to get a full light reading as well as being indoors. Maybe try it under a table!

## Stretch Tasks

Write a program that uses the LEDs to display the amount of light. There are 25 LEDs and the maximum light level is 255. If you divide these two numbers, then each LED represents approximately 10. Five LEDs represent a light level of 50.

## Final Thoughts

The ability to measure light is useful in checking proximity. This is how close the micro:bits is to an object. If it is near a wall then there will be reduced light, meaning that the micro:bit can ‘sense’ that it is near an object. Program code can then make it respond.