

Living Space

Coding the Sensor Array – Level 2
For micro:bit



Goal: To code the class sensor array so that values are scrolled endlessly across the micro:bit display.

Instructions - Part 1: Get Let's Talk Science Blocks	Blocks
Go to http://bit.ly/LTS-COZIR or https://makecode.microbit.org/28908-31820-65101-57564	
Click on the <i>Edit</i> button beside the word Let'sTalkScience	
You should now see <i>Let's Talk Science</i> with a rocket ship icon appear in the block selector menu below <i>Basic</i> . Here you will find blocks specially coded for this project.	

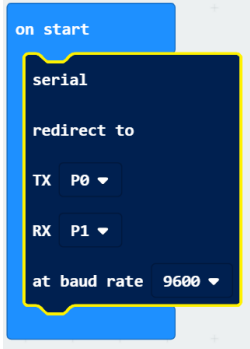
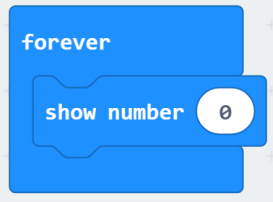
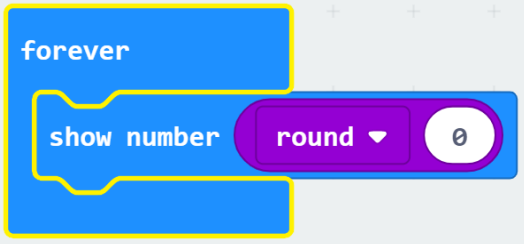
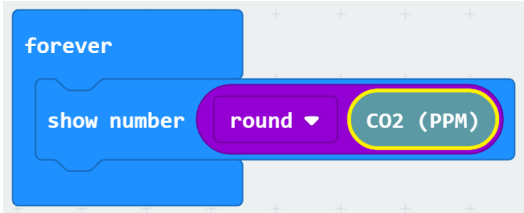
Instructions - Part 2: Coding the Sensor Array	Blocks
On the sensor array there are arrow symbols with corresponding pins: ↑ indicates the Transmit (TX) pin – it is the arrow pointing away from the middle of the board. ↓ indicates the Receive (RX) pin – it is the arrow pointing towards the middle of the board.	
You will need to set the serial input and output to the micro:bit pins that connect to ↑ (TX) and ↓ (RX). Click on the down arrow beside <i>Advanced</i> and then select <i>Serial</i> .	



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<p>Drag the <i>serial redirect</i> to block inside the <i>on start</i> block.</p> <p>Select P0 from the dropdown menu for TX Select P1 from the dropdown menu for RX Select 9600 for at baud rate</p> <p>Make sure your alligator clips connect the proper pin on the micro:bit to the correct arrow.</p>	
<p><i>Did you know?</i> The baud rate is the rate at which information is transferred in a communication channel. In the serial port context, "9600 baud" means that the serial port is capable of transferring a maximum of 9600 bits per second.</p>	
<p>Under <i>Basic</i>, select a <i>show number</i> block and snap it into the <i>forever</i> block</p>	
<p>Under <i>Math</i> select the <i>round</i> block and snap it into place where the 0 is currently showing inside the <i>show number</i> block. This will round the value from the CO2 sensor so that it will appear as a whole number on the LED display.</p>	
<p>Under <i>Let's Talk Science</i> select the <i>CO2 (PPM)</i> block and snap it into the place where the 0 is currently. This will allow the program to access the data from the CO2 sensor.</p>	
<p><i>Did you know?</i> A "String" is a sequence of characters that can contain letters, numbers and punctuation.</p>	

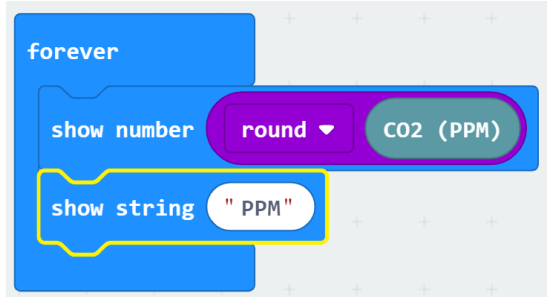


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Under *Basic*, select a *show string* block. Place it beneath the *show number* block. Type "PPM" where it says "Hello!" This will display the CO2 value with the CO2 measurement unit.



You have now finished the code to display the carbon dioxide readings.

Next up – temperature!

Right-click on the *show number* block and choose *Duplicate* from the drop-down menu.

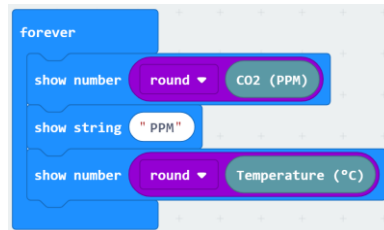


Did you know? You can save a lot of time by duplicating (copying) individual as well as groups of blocks!

Drag the block you just created below the *show string* block.



Delete the second *CO2 (PPM)* block either by dragging into the garbage can or by right-clicking and choosing *Delete Block* out of the drop-down menu.



Under *Let's Talk Science* select the *Temperature (°C)* block and snap it into the place where the 0 is currently. This will allow the program to access the data from the temperature sensor.



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Duplicate the *show string* block and drag below the *show number* block for temperature.

Change the text from "PPM" to "C".

```

forever
  show number round CO2 (PPM)
  show string " PPM"
  show number round Temperature (°C)
  show string " C"
    
```

You have now finished the code to display the temperature readings.

Last up – relative humidity!

Repeat what you did for temperature. This time you will need to replace the Let's Talk Science *Temperature (°C)* block with the Let's Talk Science *Relative Humidity (RH)* block.

You will also need to replace the "PPM" with "%RH" in the *show string* block.

Your code should look like the one at right.

```

forever
  show number round CO2 (PPM)
  show string " PPM"
  show number round Temperature (°C)
  show string " C"
  show number round Relative Humidity (RH)
  show string "%RH"
    
```

Test your work on the micro:bit simulator then save your work and upload the code to the micro:bit

Challenge Yourself!

- How could you use different blocks (e.g, pause blocks, strings, icons) for making the display easier to read?

