# Lesson 3 – Inputs

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * Understanding the key inputs in relation to the Bit:Bot and micro:bit and how we can use sensors to detect the environment around us | * Identifying the environment using sensors * Use code to take a reading from an ultrasonic sensor to gauge distance * Use code to take an analogue reading from a light sensor * Use code to detect the presence of a line or marker as part of a line follower |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Ensure Learners get practical and hands on with the sensors. * Get Learners thinking about how these sensors can be used. The pros and cons of each type | **Expected Progress:**   * Learners understand the concept of using sensors to detect values and the difference between analogue and digital   **Good Progress:**   * Learner can interpret the input from sensors and start to use selection (***If*** Statements) based on the result of sensor data   **Exceptional Progress:**   * Learners understand the limitations of the sensors |
| Links to KS3 Programme of Study | |
| * understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems * use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems | |
| Key Concepts | Key Words |
| * Sensing the environments around us * Analogue v Digital | * Light sensor * Analogue * Digital * Line follower * Ultrasonic |
| Differentiation | Resources |
| * Some Learners may have difficulty understanding why different materials react differently to sonar pulses. * Learners will need a hands-on opportunity to get a good idea of how these sensors are working | * Lesson 3 ppt * Lesson 3 Activity Sheet * PC * Paper & Coloured Pens * Access to MakeCode * Access to [www.4tronix.co.uk/bitbot](http://www.4tronix.co.uk/bitbot) if required * Bit:Bot * Torch or mobile light |
| Lesson flow | |
| * Introduce the Bit:Bot * Discuss analogue and digital and how it differs. Use examples such as sound being analogue and a switch being digital * Show Learners how to add the Bit:Bot extension – there is a video on slide 4 to support * Discuss/demo the light sensor – reinforce the difference between analogue and digital. Use the digital pin for left and right and the analogue reading of 0–1023 as an example. Remind Learners that sometimes they need to convert raw analogue data into real world data eg how bright is 1023 – how do we measure brightness? * Give Learners an opportunity to try the light sensor in different lighting environments to get an idea of sensitivity * Introduce the line sensor * Explain this is digital the line is either detected or not – 1 or 0 * Discuss what might cause the line not to be detected * Give the Learners and opportunity to experiment with line thickness and colour * Introduce sonic sensors and the concept of sonar – link this to how whales communicate or how submarines detect objects. Demonstrate how to add the sonar extension. * Demonstrate and give the Learners an opportunity to experiment with different objects made from different materials * Get Learners thinking about why different materials may reflect sound better and how we could make something easier or more difficult to detect | |
| Making | |
| There are no making activities in this lesson. | |