# Lesson 4 - Outputs

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * Understanding the key outputs in relation to the Bit:Bot and micro:bit and how these can be utilised | * Create code to flash the LEDs and control the colour being displayed * Identify the motor changes needed for specific angles * Create code to enable and disable the buzzer |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Ensure Learners get practical and hands on with using the outputs * Get Learners thinking about how these outputs can be used. The pros and cons of each type | **Expected Progress:**   * Learners drive the motor forward and backward * Learners rotate LEDs * Learners enable and disable the buzzer   **Good Progress:**   * Learners turn using a spin of the wheels * Learners move LEDs in a set sequence   **Exceptional Progress:**   * Learners make Bit:Bot follow a path such as square or triangle * Learners identify the practical speed limit for the LEDs to change |
| 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 |
| * Driving motors * Rotating and shifting LEDs * Enable and disabling buzzers | * Output * Motor * LEDs * Shift * Rotate * Buzzer |
| Differentiation | 47BResources: |
| Some Learners will find it difficult to understand why the delay is important and may find the idea of microseconds difficult  Learners will need a hands-on opportunity to get a good idea of how these outputs are working | * Lesson 4 ppt * Lesson 4 Activity Sheet * PC * Access to <https://makecode.microbit.org> * Access to [www.4tronix.co.uk/bitbot](http://www.4tronix.co.uk/bitbot) if required * Bit:Bot |
| Lesson flow | |
| * Remind Learners how to add the Bit:Bot extension * Discuss how the motors are working – the concept of ***Drive*** and ***Spin*** blocks – explain to Learners that there is no specific ‘turn x degrees’ command. They will need to figure this out but utilising different power and direction commands to the different wheels * Demo the use of motors – get Learners to try the motors on different surfaces and see how this changes the way they work. * Demo the use of LEDS. Explain the difference between shift (move along one) and rotate (go back to the beginning once you reach the last one) * Demo the use of the buzzer. Explain how they will need to use a combination of on, off and delay to control the buzzer * Give the Learner the Activity Sheet and get them to complete the tasks * Encourage Learners to experiment and attempt the Stretch Tasks | |
| Making | |
| No making activities in this lesson. | |