# Lesson 5 – Drawing Pictures

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * Demonstrates how Learners will need to use power and direction to turn through specific angles * Enable the Learners to control the Bit:Bot movements in a precise manner | * Apply understanding of motor outputs * Develop understanding of iteration (Looping) using conditional and count controlled loops * Plan and draw shapes using iteration |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Ensure Learners get practical and hands on with using the Bit:Bot * Learners will find it interesting to do this as a set of timed challenges. Different number of shapes in a set time * Remind Learners of the concept of fail early, fail often and that to draw precise shapes they will need to practice | **Expected Progress:**   * Learners can drive the motor forward and backward to draw an unplanned shape   **Good Progress:**   * Learners can draw simple pre-planned shapes   **Exceptional Progress:**   * Learners can create pre-planned complex shapes and polygons |
| Links to KS3 Programme of Study | |
| * understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits | |
| Key Concepts | Key Words |
| * Driving motors * Angles * Trial and error | * Iteration * Loop * Count controlled loop * Conditional loop * Polygon |
| Differentiation | Resources |
| This challenge is more difficult than it looks and some Learners will get frustrated at the lack of precision.  Remind Learners that they can be more precise with slower turns.  Some Learners will need support aligning the pen so it draws correctly | * Lesson 5 ppt * Lesson 5 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. 4 are recommended which can be shared between groups * Paper & pens * Lesson 5 Octagon.hex * Lesson 5 square.hex |
| Lesson Flow | |
| * Share objectives * Remind Learners how to add the extensions if not already added * Demonstrate how to attach the pen holder * Give the lesson Activity Sheet * Discuss the terms sequence and iteration as programming constructs with the benefits to memory usage and error checking * Demonstrate how to turn and spin and show how speed makes it more difficult * For reference a speed of 60% and turn of 200ms is about 90deg and 60% @100ms is about 45 degrees but this is very battery and floor material dependent * Learners should initially plan their algorithms and sketch what the shape should look like. Once they have predicted what the output will be they should then run the program on the bit:bot to see how close they are. Learners should only borrow the bit:bot once the code is ready to be executed. * Get Learners to draw a range of polygons or other shapes – An example of a square and octagon are in the examples folder | |
| Making | |
| There no making activities in this lesson. | |