# Lesson 16 – Smart Robotics Project The Brain

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * Understanding the uses of embedded systems and how these can be programmed using different languages and paradigms | * Identify some examples of embedded systems * Create examples of code in both text and block-based languages * Produce functional algorithms using block code * Identify the benefits and disadvantages of both block and text-based coding |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Give Learners the opportunity to use both block and text languages * Remind them of fail early, fail often | **Expected Progress:**   * Learners can identify how to modify a block function to produce an output   **Good progress:**   * Learners can identify the difference between the scroll and show feature   **Exceptional progress:**   * Learners can produce unique functions using block or text-based languages |
| Links to KS3 Programme of Study | |
| * use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions | |
| Key Concepts | Key Words |
| * Embedded systems * Event driven and functional programming paradigms | * Embedded system * Functional * Event driven |
| Differentiation | Resources |
| * Some Learners will struggle to spot errors using text-based languages. Encourage them to count pairs of speech marks or use rulers to line up spaces | * Lesson 16 ppt * Lesson 16 Activity Sheet * Sample Python Programs * PC * Internet access * Access <https://makecode.microbit.org> * Access to [micro:bit Python Editor](https://python.microbit.org/v/3) * micro:bit |
| Lesson Flow | |
| * Introduce the learning objectives * Discuss embedded systems and the benefits of embedding small computers like micro:bits or arduinos into devices rather than using general purpose PCs * Give some examples of embedded systems and get the Learners to start to think of the functions of commons embedded systems see worksheet for two examples * Discuss the pros and cons of the text v block techniques. Demo simple examples and let the Learners experiment with the two techniques * Remind Learners how easy it is to make mistakes but to use the fail early, fail often approach – paired programming often helps identify text programming errors * Discuss event driven programming and then demonstrate the block and text examples (Learners again can give this a try) * Discuss functional programming (slide 7) using the example on slide 8 to demonstrate – try to get Learners to spot for themselves that the block code has no output and get them to look at where the output is on the text code and where it should therefore go on the block code * Get Learners to modify the block code * Share the Lesson Activity Sheet * Encourage Learners to attempt the Stretch Tasks | |
| Making | |
| No making activities in this lesson. | |