# Lesson 12 – Acceleration and the Accelerometer

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * Crash or collision detection systems are an extremely important safety system in vehicles, especially self-driving cars. Changes in acceleration are used indicate what a vehicle is doing and respond in an appropriate way | * Know what an acceleration is * Define the role of an accelerometer * Know the three axes *x*, *y* and *z* * Use code to measure acceleration on one axis and respond to reading * Apply understanding to measure acceleration on two or three axes and code responses |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * The crash detector can be comical although the teacher will need to be aware if learners have had / or family been involved in accidents * The testing section will allow for group work which can engage and motivate the learner | **Expected Progress:**   * Learners know what acceleration is * Learners use micro:bit to take an acceleration reading   **Good Progress:**   * Learners code a response to acceleration reading * Learners take readings on two axes   **Exceptional Progress:**   * Learners take readings on all three axes |
| 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 * understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems | |
| Key Concepts | Key Words |
| * What is acceleration * What is an accelerometer * *x*, *y* and *z* axes * Taking acceleration reading and responding to the value | * Acceleration * Accelerometer * Selection |
| Differentiation | Resources |
| Visualising the *x*, *y* and *z* axes is hard, consider learners having a physical micro:bit in their hands to move through the axis.  To make an accurate crash detection system learners will need to test and refine the values. | * Lesson 12 ppt * Lesson 12 Activity Sheet * Sample Python Code * 1 micro:bit per learner   + 1 USB cable to connect the micro:bit to a PC   + A PC * Battery pack * Sticky tape * Access to <https://python.microbit.org/v/1.1> |
| Lesson Flow | |
| * Introduction to what acceleration is * Explanation of the *x*, *y* and *z* axes * Class discussion on example program * Learners try out program, Activity one * Teacher to support and intervene where required * Teacher demonstration of crash detector * Learners work through activity two and build their version * Learners test their programs * Learners refine their programs * Teacher encourage more advanced learners to attempt the stretch tasks once they complete main task | |
| Making | |
| There are no making activities in this lesson. | |