Lesson 18 – Project – Bike Collision Detection  
Container and Program development

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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 to indicate what a vehicle is doing and respond in an appropriate way. | * Develop and build the container to hold the micro:bit * Develop program code for one axis * Test that the values in the code are suitable |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Bring a real bike into the classroom and ask Learners to talk about their own experiences * The bike 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 create a basic container for the micro:bit   **Good Progress:**   * Learners develop a suitable container that can be attached safely to the bike * Learners add additional hardware such as sound or an LED   **Exceptional Progress:**   * Learners begin programming the code |
| Key Concepts | Key Words |
| * Recap the project brief * Plan the container * Develop the container for the bike * Test that it holds the micro:bit * Develop the program code * Taking acceleration reading and responding to the value on at least one axis | * Variables * Acceleration * x, y, z axes |
| Differentiation | Resources |
| Learners will benefit by working in groups, if the Learners are organised with a mixture of skills and abilities.  Teacher to support Learner to get the *x*-axis working first and then build up the *y*- and *z*-axes. This will ensure that the project is easier to complete. | * Lesson 18 ppt * 1 micro:bit per Learner * 1 USB cable to connect the micro:bit to a PC * A PC * Access to <https://python.microbit.org/v/1.1> * Arts and crafts * Bike |
| Lesson Flow | |
| * Starter – label the axes *x*, *y* and *z* on the diagram * Teacher to recap the project * Discuss staying safe on your bike and how you might know that you were unsafe, (leaning too far to one side, hard braking, cycling too fast etc.) * Discuss the Success Criteria and how these could be met * Learners use the planning sheet to begin to develop the container for the micro:bit * Discuss where the best location on the bike is for the hardware set up (handlebars, frame etc.) to attach the micro:bit to the bike * Learners could work in groups and deploy one team to start thinking about the program code and one design the container system * Try hardware on the bike to see what works well and make adjustments as required * Teacher to support Learners and groups | |
| Making | |
| * Develop the container | |