# Lesson 4 – Baseball bat – accelerometer

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| 40BThe big picture – why is this relevant? | 41BLearning objectives: |
| Many learners will have used an accelerometer when playing games on their mobile devices. This lesson introduces them to the technology behind the accelerometer and enables them to produce a device which measures the acceleration of a baseball bat. | * Understand how an accelerometer measures acceleration * Understand how an accelerometer can be used * Understand how to program an accelerometer for use with an Arduino |
| 42BEngagement – how can I engage learners? | 43BAssessment for learning |
| * Learners will be engaged and motivated by the context as they will understand the technology that allows them to control sprites when playing games * Learners will enjoy testing their products as it has a physical aspect of hitting a baseball | **Expected progress:**   * Learners will understand the purpose of an accelerometer * Learners will be able to upload code to measure acceleration   **Good progress:**   * Learners will understand the purpose of an accelerometer and how the acceleration is measured along 3 different axes * Learners will be able to upload code to measure acceleration and understand the different code structures which are used * Learners will be able to measure the acceleration when hitting a baseball   **Exceptional progress:**   * Learners will understand how a 3-axis accelerometer works * Learners will be able to write code to measure acceleration * Learners will be able to interpret the results from measuring acceleration when hitting a baseball |
| 44BKey concepts: | 45BKey words: |
| * Accelerometers measure acceleration along three different axes * Accelerometers are used to control sprites when playing games on mobile phones | * Sensors * IoT * Node * Gateway * Accelerometer |
| 46BDifferentiation: | 47BResources: |
| This project is largely differentiated by outcome. Stronger learners can start designing creative solutions to securely attach the device to a baseball bat. | * .ppt * Arduino MKR 1000 * Battery * MKR Connector Carrier * Grove 3 axis accelerometer |
| Lesson flow | |
| * Introduction to the purpose of an accelerometer * Discuss how acceleration is measured on three different axes * Discuss the purpose of the project – to measure the force exerted when hitting a baseball with a bat and how these results can be interpreted * Introduce the success criteria and discuss initial ideas on how to solve the problem * Introduce what will be sensed by the Arduino for this product and how it will upload the data via Wi-Fi * Learners should then develop an IPO for the device * Provide the learners with the activity sheet. Learners will need to develop their algorithm prior to commencing the built * Attach the MKR 1000 to the connection board and attached the accelerometer * Code the solution in the Arduino cloud. Support learners as necessary. Weaker learners may need to work from a template to assist them in developing the code * Any students who are particularly capable can use the IPO worksheet to plan additional features such as how results can be interpreted | |
| Making | |
| * This activity includes making the product and also a case to contain the Arduino, battery and any other peripherals used. * The product will need to be tested, and should only be used if it can be safely attached to the baseball bat without any possibility of it become detached in use. | |