# Lesson 9 – IoT Project

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| The big picture – why is this relevant? | Learning objectives: |
| * This is an open-ended project where Learners will use the skills, code and hardware that they have learnt about in previous lessons to build an IoT device using the Arduino * The lesson will give them the opportunity to be inventive and demonstrate what they have learned throughout the course | * Be able to develop a solution to meet their own pre-defined Success Criteria * To understand the purpose of testing and be able to test a product again success criteria * To be able to effectively communicate new product ideas clearly in a short period of time * To be able to critically reflect on the development process and identify potential improvements |
| Engagement – how can I engage learners? | Assessment for learning |
| * Motivate and support groups and learners where required * You could refer learners to other groups that have had success with an element of the project for support | **Expected progress:**   * Learners build an IoT device largely based on one of the other projects   **Good progress:**   * Learners will build an IoT device which combines the functionality from two or more of the projects covered in the course   **Exceptional progress:**   * Learners will develop their own unique IoT device using a wide range of peripherals to produce a creative solution |
| Key concepts: | Key words: |
| * When a product is developed, it is important to check the product addresses the success criteria * Once a product has been produced it is important to reflect on what went well and what could be improved as this could inform future development processes | * Iterative testing * Final testing * SMART |
| Differentiation: | Resources: |
| Learners may wish to work in small groups. If they do work in groups, it is important to ensure that are all involved and that no one is taking a back seat.  Some groups / learners may need clear direction on what to do and how to proceed. Advise and direct learners. Set clear requirements for them, | * .ppt * Design sheet * Project overview * Access to previous lesson resources and hardware from previous lessons * Making materials * Arduino MKR 1000 * Range of Arduino peripherals used throughout the course * Cheat sheets and sample code |
| Lesson flow | |
| * Introduce learners to the project. They will be demonstrating the skills that they have learned throughout the course by developing their own IoT device. * Introduce the Global Goals and explain that they need to choose one to work with * Show learners the mark grid which takes the format of a statement bank with a number of different categories. A wide range of skills are being assessed so those who have weaker coding skills shouldn’t be concerned. * Display some ideas that other learners have come up with in previous projects. Videos could also be shown from social media to demonstrate some of the devices which others have produced. * Learners should then write down the success criteria for the model. These should be SMART. Discuss the meaning and importance of SMART objectives. * Discuss the purpose of iterative and final testing. Learners should then produce a test plan for their device. * Learners should then start to develop their algorithms and hardware list. Weaker students may wish to adapt a prior project. The algorithms can either be written in flow chart or pseudocode form. Stress that, once learners start to develop their device, they may wish to amend their algorithm; this is fine. * Learners should carefully consider the hardware that they have available when starting to design their solutions. Cheat sheets have been provided to assist learners with connecting to the Arduino cloud, controlling an LED, connecting an air quality sensor and recording measurements in the cloud, connecting and LED screen and connecting a GPS module. Sample code has also been provided. It is like that students will need to adjust the code to meet their needs. When exploring sample code, they should be encouraged to initially try to predict what will happen when they run the code. They should then run it and evaluate whether their predictions were correct. This will help them to develop an understanding of new code structures which will enable them to use them in their solutions. * Circulate the room and support learners with their ideas and solutions. Try to refer to previous lesson activities and resources * Halfway through the lesson, learners should nearing completion of their product. Stress to learners that they will need to test their product against specific success criteria. * Learners should then continue working on their device. * It is likely that this lesson may take several periods to complete. Learners could complete a peer assessment activity where midway through the build feedback and suggestions for improvement could be made. * Once the device has been completed, learners should prepare a Dragon’s Den style pitch where they demonstrate their product to fellow learners. They should then complete the course evaluation activity. | |
| Making | |
| * Creating the physical IoT device | |