TECH FUTURE CLASSROOM

Together with O2

Wearable tech with O2

A teacher's guide to delivery

Introduction

This project has been developed with the support of O2, to introduce students to wearable technology and the Internet of Things. Students are provided with a brief – to create a wearable device that monitors the proximity of a child to a parent – and are then given all the guidance needed to design and build the device. There is also a downloadable Android app that is used to connect to an iBeacon which acts as the sensor within the device. This has been built for this project by the team at the O2 Labs in Slough for use in schools.

We have produced an e-learning module to start the project which explains how wearable technology works within the Internet of Things, and also covers issues around security, and form and function in the design process.

A set of five Open Badges are available to students who complete tasks along the way, including completion of the e-learning module.

To help you with the technology, there is a guide to downloading the Android app and pairing the iBeacon with the app to model the proximity sensing device. You will find this alongside this document in the Resources section.

Resources provided

On the course page, there is a bank of resources underneath the e-learning modules that scroll using the arrows at each end of the row.

You are provided with the following resources:

- The e-learning module which students can work through individually in the classroom or at home – this includes seven pieces of video featuring O2 employees talking through the technology that underpins the Internet of Things and wearable devices
- Information documents on Wearable Technology, the Internet of Things, Sensors, Bluetooth Technology, Security, and Form and Function
- Video that explains the technology, and how the iBeacon and phone app work together
- Link to the downloadable Android app
- A guide to setting up the app and iBeacon
- A completion certificate for the e-learning module

Gaining Open Badges in the Tech Partnership Badge Academy

There are five Open Badges available for completion of tasks within this project. Students who complete the e-learning module, gaining a certificate of completion, can use this to claim the **Wearable Tech - Knowledge** badge from the Tech Partnership Badge Academy.

The **Wearable Tech – Technology** badge is available to students who demonstrate they have understood the technology by working through an assessed e-learning module that is on the course page.

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The **Wearable Tech – Security** badge can be earned by students who demonstrate they have understood the security implications of the Internet of Things and wearable technology by working through an assessed e-learning module that is on the course page.

Students can also gain the **Wearable Tech – Design** badge using evidence of their prototyping and design activities.

Finally, the **Wearable Tech – Project Completion** badge is available to students who produce the wearable device and present it to an audience, evidenced by a video.

The Knowledge, Technology and Security badges are automatically verified by the Badge Academy – students will be awarded the badge on completion of the e-learning and by achieving a score of 80 percent on the assessment. The Design and Project Completion badges are verified by uploaded evidence and are dependent on teacher verification. More information about how to do this is available in the Guides section on the Learning Hub.

Steps in the e-learning content

The following table shows the steps in the e-learning and how students are presented with the information they need to complete the project.

Steps in the e-learning content	Detail
The challenge	Charlie, an O2 Guru, explains the project and the brief to design a piece of wearable technology
The Internet of Things icon – video presentations	Link to further information on what tech can do and the Internet of Things through two video clips. Courtney, who works in IT at O2, explains the Internet of Things. Charlie explains how wearable devices link to the Internet of Things, and what these devices can do.
The Internet of Things – additional information and examples	Examples include the Internet of Lettuce, the Internet of Toilets, the Internet of Fridges, the Internet of Slippers, the Internet of Nappies and the Internet of Cows.
The Apple Watch	Information about the Apple Watch and what it can do
Wearable Tech Quiz	Set of five true/false questions to assess students' understanding
Wearable Tech icon – information and examples	Examples include Apple Pay, Google Glass, and remote recording of TV programmes
Improve Lives icon – video presentations	Courtney explains the technology, focusing on sensors. Charlie explains Bluetooth technology.
The Smart Phone	Explaining the technology within a smart phone
Sensors Quiz	Match the sensors to their function.
Tech Quiz	Set of five true/false questions to assess students' understanding
Exploring Tech icon – video presentations	Charlie talks about form and function – the design of the wearable device. Courtney talks about security of the device.

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Designing Technology	Recap of form, function and security and how the wearable device must serve to solve a problem or deal with an issue.
The O2 Challenge	Becomes available when all other icons have been explored. Downloadable document is made available to explain the brief.
Examine – create	Steps that explain how to create a new product starting with examining the problem and moving through research, brainstorming, experimenting to creating the solution.
Summary	Brings together the learning outcomes and encourages students to complete a survey.

Building the device

When students have worked through the e-learning, they can move on to build their devices in small groups or teams.

They are asked to create something that a child can wear which incorporates the iBeacon which is then paired to the downloadable Android app. Students can actually demonstrate this providing they have the app on an Android phone, and have created a device for the child to wear, which could be a badge, bracelet or pendant, or it could be inserted into a garment or pocket.

The steps, as detailed in the e-learning, will include thinking about the best wearable device for a young child – something they cannot instantly remove and discard, and which the child may actually want to wear. They can prototype this on paper or on CAD software, thinking about the design (form) and perhaps collecting some information on their ideas from parents and younger siblings. If available in your school, they could 3D print their prototype design.

Linking the iBeacon with the phone is explained in the **Guide to using the app and iBeacon** downloadable from the website. There are ideas in the guide for experimenting with the iBeacon and phone app even if a wearable device has not been completed.

Exploring the security of the iBeacon is important and is covered briefly in the e-learning unit. Students who wish to gain the **Wearable Tech – Security** badge will look at this in more detail and work through the assessed e-learning module on the course page.

Suggested timings for delivery

Students can complete the main e-learning module, and achieve the Knowledge open badge, within one lesson.

The Technology and Security modules could be completed in a second lesson, by which time students will understand how to pair the Android phone app with the iBeacon. Students achieving 80 percent or more will automatically receive the associated Open Badges.

A third lesson would be enough for the design phase, where students can paper-prototype their design and, if available, use CAD software to go further. Extension activities involving 3D printing will be available in the summer term for schools who have the required hardware. This will allow students to print their wearable tech holder for the iBeacons.

Lesson four would allow students to demonstrate the working wearable device, try out the different settings (as explained in the **Guide to using the app and IBeacon**). They could try out different environments (e.g. inside and outside, busy or empty rooms) to see how effective the device is within different locations.

If you have questions or queries about this project, contact learning@thetechpartnership.com and we will do our best to respond within 48 hours.

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