# Lesson 14 – Internet of Things, Smart Cities and Threats

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * The Internet of Things (IoT) is changing the way that we interact with everyday objects * As our cities become more densely population we face a number of challenges. Future technological advancements can help to overcome these * As more and more devices communicate via the Internet this also brings a number of threats which need to be considered when designing systems. | * To understand that the IoT is a wide range of different devices which are connected to the internet * To understand the threats that communication via the Internet can cause and the steps that can be taken to overcome them |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Learners will explore how different processes can be applied to change a variety of different inputs into outputs * Learners will be able to develop their own processes to apply to inputs * Learners will carry out a creative exercise where they will be able to think outside the box and come up with their own ideas concerning how devices could make use of the internet | **Expected Progress:**   * Learners shall use the internet to independently answer the IoT questions. They should understand the benefits and threats that the IoT offers   **Good Progress:**   * Learners will be able to identify the benefits of being able to connect devices to the internet * Learners will understand the benefits and potential drawbacks of the IoT. * They will understand the threats that are faced and will be able to make suggestions as to how these threats can be overcome   **Exceptional Progress:**   * Learners will be able to discuss their own ideas on how devices in the future could be connected to the internet and the advantages and disadvantages of being able to do this * Learners will understand the meaning of the terms protocol and encryption |
| Links to KS3 Programme of Study | |
| * Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems * understand a range of ways to use technology safely, respectfully, responsibly and securely | |
| Key Concepts | Key Words |
| * The IoT relates to a wide range of objects that contain computers which allow them to communicate over the internet * Through connecting devices over the Internet we can overcome some of the issues which densely populated areas face * As devices communicate via the Internet the data that is transmitted has to be secured | * Internet of Things (IoT) * Internet * Protocol * Encryption * Virus * Firewall * Malware * Anti-malware |
| Differentiation | Resources |
| Once learners have thought about the advantages of being able to connect a range of devices to the internet more capable learners may be able to identify some of the disadvantages.  More capable students may wish to explore the purpose of protocols and which specific protocols IoT devices will use to communicate. They may also wish to explore different methods of encryption e.g. the Caesar Cipher. | * Lesson 14 ppt * Lesson 14 Smart Cities ideation worksheet * Lesson 14 IoT Challenges worksheet * L14 Matching Terms Worksheet |
| Lesson Flow | |
| * Introduce the IoT through discussing the ppt. This will show learners some of the technology involved in IoT devices. * Discuss the potential issues with having densely populated areas. Ask Learners what the challenges could be which cities are facing. You should then show the video on the ppt. If there is time you may wish to also look at how Singapore has used technology to overcome challenges. * Learners should then work through the Smart Cities ideation worksheet. * Discuss Learners ideas with the class and potential issues that may be faced with connecting devices. Ask learners if they can think of how these issues may be overcome. Learners should then complete the challenges worksheet. * Discuss how potential threats could be overcome. Highlight the importance of changing default passwords to something more secure. Ask learners what elements should be included in a password to ensure that it is secure (e.g. upper and lowercase letters, numbers, special characters, minimum of 8 characters long etc.). Highlight the meaning of the encryption and protocols. These concepts will be revisited in more detail in future lessons; learners should just understand the meaning of the terms at this stage. Learners should then complete the matching terms worksheet. * Introduce students to the Project Based Learning approach that they will be using in a number of projects. Use the ppt as support. Students should be organised into groups of 4 with each member of the group taking a different role. They should alternate roles for each project so that each member of the team experiences each of the roles. | |
| Making | |
| There are no making activities in this lesson. | |