# Lesson 2 – Input Process Output Model and Internet of Things

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * All systems take inputs, process those inputs and then display the result of processing as an output * Learners will develop their own solutions using inputs, processes and outputs (IPO) * The Internet of Things (IoT) is changing the way that we interact with everyday objects * The traditional idea that only personal computers and smartphones can connect to the internet is no longer true. Many devices from washing machines and fridges through to vacuum cleaners and light bulbs can now be connected to the internet | * To understand that inputs are taken in by a system, processed and then the result of the processed inputs becomes the output * To understand that the IoT is a wide range of different devices which are connected to the internet * To understand how inputs and outputs can take many different forms * To understand what an embedded system is |
| Links to Program 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 how instructions are stored and executed within a computer system | |
| 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 * Learners will have the opportunity to be creative and come up with their own ideas over where the IoT could take us in the future | **Expected Progress:**   * All learners will understand how processes can be applied to change inputs into outputs * Learners will understand that the IoT relates to a number of household items which are connected to the internet. Learners will use the internet to independently answer the IoT questions. They should understand the benefits that the IoT offers   **Good Progress:**   * Learners will be able to develop instructions to process inputs into outputs * Learners will be able to identify the benefits of being able to connect household devices to the internet * Learners will understand the benefits and potential drawbacks of the IoT   **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 |
| Key Concepts | Key Words |
| * The IoT relates to a wide range of objects that contain computers which allow them to communicate over the internet * Input devices are used to put data into a computer system * Processes are used to perform instructions on inputs * Output devices are used to show the result of any processes carried out on inputs * The internet is a globally connected network of devices * The IoT allows everyday objects to the connected to the internet using an embedded system | * Input Process Output * IoT * Internet * Embedded system |
| Differentiation | Resources |
| Once learners have thought about the advantages of being able to connect a range of household devices to the internet learners should be able to independently answer the questions using the internet as a reference. If necessary, provide students with prompts and suggest which sites that could use to help them. More capable students may wish to explore the purpose of protocols and which specific protocols IoT devices will use to communicate. | * Lesson 2 ppt * Lesson 2 IPO worksheet * Lesson 2 IoT worksheet * Lesson 2 IoT ideation worksheet |
| Lesson Flow | |
| * Introduce learners to the concept of IPO. Students should identify as many input and output devices as they can think of * Remind learners of the input and output elements on the micro:bit. Ask if anyone can see which part of the micro:bit will process the inputs. * Using the IPO worksheet learners should work through the tasks to identify what the outputs will be once the processes have been carried out on the inputs. Stress that all computer systems use similar IPO models. Highlight the fact that computers can only carry out relatively simple mathematical processes, they can just do them very quickly * Discuss the meaning of the term ‘Internet of Things (IoT)’ * Students should work through the IoT worksheet where they will try to identify why a range of household devices could benefit from being connected to the internet * Discuss the use of embedded systems and explain what an embedded system is. Explain that it is the embedded system that is used to connect the device to the internet. * Learners should then use the ideation worksheet to identify which devices may be connected to the internet in the future and the benefits that this will offer | |
| Making | |
| There are no making activities in this lesson. | |