# Lesson 7 – Temperature sensor and Selection

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * This project introduces the various sensors built into the micro:bit and explores how they can be used in a real world application * Smart homes are now becoming more prevalent and the programs and hardware used in these devices is similar to that in the micro:bit * Different tasks need to be carried out depending on whether different conditions are true or false. When executing computer code certain lines of code will only need to be run if a condition is true. This was represented as a diamond shape in the flowcharts which learners studied in a previous lesson. In computer code if then else statements are used. | * Understand what a ***forever*** loop does * Understand the various sensors on the micro:bit * Understand that if code is only to be executed if a condition is true then an if then else statement can be used * Use a logical operator in a program * Learn how to duplicate blocks to save time * Consider what other applications the sensors could be used for in a product |
| Links to KS3 Programme of Study | |
| * Undertake creative projects that involve selecting, using, and combining multiple applications, preferable across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users * Use two or more programming languages to solve a variety of computational problems | |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * This project has real world application and the stretch tasks take the concept into the world of Internet of Things (IoT) * Learners will use a number of real-world scenarios to demonstrate how different actions will need to take place depending on whether conditions are true or false * Encourage learners to think about how the sensors could be used to solve a problem or how to help a person or business * Encourage learners to research solenoids and other peripherals to expand the capability of the micro:bit for other uses | **Expected Progress:**   * Learners will produce a temperature sensing program using selection and computational logic * Learners will understand the need for different pathways to be taken through programs depending on whether certain conditions are True or False and should be able to trace through given algorithms to determine the output   **Good Progress:**   * Learners will adjust the program to suit their individual preferences * Learners will understand the need for if then else statements to determine whether a line of code should be run. They will be able to trace through algorithms to determine outputs and create their own flowcharts using decisions   **Exceptional Progress:**   * Learners will research what a solenoid is and will consider how it could be used to control a machine * Learners will be able to use if then else statements appropriately within their code. They will understand that the else statement is needed as a ‘catch all’ to handle unexpected inputs without crashing |
| Key Concepts | Key Words |
| * Code will not always run line by line in the same order * At times certain lines of code will only need to be executed if a condition is true or false * Computer languages use if then else statements to take different pathways through programs * Computational logic | * Sensor * Analog * Digital * Solenoid * Sequence * Selection * Condition |
| Differentiation | Resources |
| Most Learners will be able to follow the instructions however adding a program to a microcontroller maybe a new concept to some learners and they may need support with getting the files onto the micro:bit initially.  More capable Learners will be able to create their own algorithms using their own if then else statements. The final task gives users the opportunity to develop an algorithm for their a game or rock, paper, scissors. More capable learners will be able to introduce a wider range of decision blocks and creativity in their algorithm | * Lesson 7 ppt * ‘Sensing Your World’ worksheet * Lesson 7 Activity Sheet * Lesson 7 If Then Else worksheet * 1 micro:bit per learner * 1 USB cable to connect the micro:bit to a PC * A PC * Access to 30T<https://makecode.microbit.org/> * IfElseUmbrella.hex * TemperatureSensor.hex * TemperatureSensorSelection.hex |
| Lesson Flow | |
| * Using the ppt to support the discussion talk through the purpose and different types of sensor that exist * Introduce the concept of a ***forever*** loop * Introduce the Success Criteria for the sensing your world activity * Explain the logical operators if necessary * Show learners where the resources are on the PC * Learners work through resource independently; teacher intervenes where appropriate. Any students who complete the task early can research what a solenoid is and attempt the stretch task * Encourage more advanced learners to attempt the stretch tasks once they complete main task * The sensing your world task introduced students to endless loops. Learners should now be introduced to multi level selection statements. Use the ppt to introduce if then else statements * Students should then complete the IF, Then, Else worksheet. If students have time, they could attempt the extension activity which is to produce an outline flowchart for a game of rock, paper, scissors. | |
| Making | |
| There are no making activities in this lesson. | |