# Lesson 13 – Making a Compass

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * The aim of this lesson is to draw together learning from previous lessons. Learners will be able to program a multi-level if statement * Learners will use a flowchart to plan their algorithm prior to coding it in MakeCode * In many programs data will need to be stored. This is saved in a variable which is a named location in memory. The compass heading will be saved as a variable * This lesson will introduce learners to using the built in speaker on version 2 of the micro:bit | * Understand how the reading for the number of degrees can be translated to the heading * Understand how to use a multi-level if statement * Represent an algorithm using a flowchart * Understand how to activate and use the built in speaker |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Learners will enjoy using another one of the built-in sensors on the micro:bit for the first time * Learners will gain a sense of achievement through being able to use the skills that they have developed in previous lessons | **Expected Progress:**   * Learners will be able to follow the tutorial to create a compass. They will understand how a sensor can be used to measure the direction that they are pointing * They will be able to use the built in speaker to play a sound   **Good Progress:**   * Learners will understand why different bandings are needed to determine the direction that they are pointing in. They will be able to accurately represent the algorithm using a flowchart   **Exceptional Progress:**   * Learners will be able to develop the program in the tutorial to include additional, more accurate headings such as North West and South West. |
| Links to KS3 Programme of Study | |
| * Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems * Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability | |
| Key Concepts | Key Words |
| * Sensors can be used to detect measurements * An if, then, else statement can be used to determine the direction in which the micro:bit is pointing * Additional else if statements can be used to increase the level of accuracy | * Heading * If Then Else * Selection * Sensor * Variable |
| Differentiation | Resources |
| More able learners should add extra functionality to their program. They should add additional elseif statements so that North East, South East, North West and South West are able to be determined | * Lesson 13 ppt * Lesson 13 Compass worksheet * Access to <https://makecode.microbit.org> |
| Lesson Flow | |
| * Introduce the concept of a compass. Discuss why they can be used when carrying out tasks such as navigating a map * Discuss how North, East, South and West are measured on a compass. Discuss that certain bandings represent different directions. Ask learners how this could be coded. More able learners should be able to identify that an if, then, else statement would be required * Learners should then use the first activity on the compass worksheet to try to create a flowchart to represent the algorithm that will be required * Discuss the purpose of variables and demonstrate how to create a variable in MakeCode. * Learners should then work through the tutorial to create a compass on the micro:bit using the make code website. More capable learners can try to include additional blocks to include more accurate directions e.g. North West. If learners have access to version 2 of the micro:bit allow them to use the built in speaker to play a different sound for each direction. Note that the speaker will initially need to be activated using the set built-in speaker block inside of the on start loop. | |
| Making | |
| There is no making activity in this lesson. | |