# Lesson 11 – Direction and Compass

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| Digital compasses are used in everyday life to locate and find direction and bearings. Did you know that Magnetic North moves around the planet and has to be calculated everyday by humans? | * Be aware of North and True North * Understand how a magnetometer works * Calibrate the compass on the micro:bit * Program a real time compass |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * The teacher could demonstrate the micro:bit compass as learners enter the room. * The treasure hunt is a fun partial activity which learners can work together on. | **Expected Progress:**   * Learners can calibrate the compass   **Good Progress:**   * Learners build a real time compass * Learners know the difference between North and True North   **Exceptional Progress:**   * Learners create a complex treasure hunt with at least 15 instructions |
| Links to KS3 Programme of Study | |
| * use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions * understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems | |
| Key Concepts | Key Words |
| * North and True North * Magnetic fields * How a magnetometer works * Calibrate the compass * Coding a compass | * North and True North * Magnetometer * Compass |
| Differentiation | Resources |
| For less able Learners you could provide the compass program for them so that they can still create a Treasure Hunt. More able Learners may want to compare the micro:bit compass with a traditional model and look for inaccuracies and reliability. | * Lesson 11 ppt * Lesson 11 Activity Sheet * Sample Python code * 1 micro:bit per learner * 1 USB cable to connect the micro:bit to a PC * A PC * Battery Pack * Access to [micro:bit Python Editor (microbit.org)](https://python.microbit.org/v/3) * Pen and Paper |
| Lesson Flow | |
| * Introduce the concept of north and true north * Explain what a compass is, Learners may have one on their smartphones which they could look * Explain how the magnetometer works and measures magnetic fields * Learners write the program to calibrate their micro:bit compass * Learners complete main activity and program real time compass * Learners create Treasure Hunt instructions * Share with other Learners to solve * Teacher to support where required | |
| Making | |
| There are no making activities in this lesson. | |