

Lander Challenge Teaching Notes

This activity allows the inclusion of programming into a Physics or Engineering challenge. This has been successfully adapted for use in the KS2, KS3 and GCSE curriculums. It is also a good team-building challenge for all ages.

The Lander Programming Worksheets provided allow the use of Micro:Bits to communicate live data on the acceleration of a falling object.

For Physics, Micro:Bits can be included in parachute testing covering *forces, gravity, drag, terminal velocity* and *acceleration*.

For Engineering, the wording of the challenge is changed to 'Lander' as it is a more open description which does not lead students to automatically create parachutes.

Depending on the availability of Micro:Bits, you can have students program two each (receiver and transmitter), one each (the transmitter) whilst having a pre-programmed receiver, or pre-program both a transmitter and receiver to use in the testing.

If using multiple transmitters, ensure each one is on a different radio channel to prevent interference. There are 256 channels to choose from (0-255). If there is only one receiver ensure you change the radio channel to match the transmitter being tested (don't forget to download the change to the attached Micro:Bit).

The program given in the worksheets is designed to provide an absolute value for acceleration as the Micro:Bit measures directionality, and will therefore supply negative acceleration values which can cause confusion.

Each graph can be saved as an Excel file for printing and/or further data analysis.

Important!

Do not drop a Micro:Bit without any protection/parachute from any height. They are breakable.

For a lander, drop no more than 1.75 metres. If you have concerns that the design will not protect the Micro:Bit, that design fails and is not drop tested.

Parachute testing requires more height, so run initial tests with a load of the same mass, then decide which designs are safe to test with a Micro:Bit.

Make sure no glue or tape is directly attached to the Micro:Bit – the design should allow for easy insertion and retrieval of the transmitter.