BBC LEARNING PRESENTS

micro:bit: Mission to Mars – Live Lesson

Date: Tuesday, 7th June 2016
Time: 11:00am
Approximate duration: 50 minutes
Location: bbc.co.uk/livelessons
*(**Note:** if you can't watch the webcast live, you will be able to watch the recording on the Live Lessons website)*

Setup

How much space and equipment is needed?

The lesson can be screened in a classroom or computer laboratory with a large screen linked to a reliable broadband connection. Good audio equipment is not essential but will make the event more enjoyable.

Students will benefit from ready access to a computer with an internet connection. However, students can also participate in the activities before and after the programme, so this may not be essential if your setup does not allow for it.

If the students have access to a BBC micro:bit, it would be ideal if they had to hand:

- Their **BBC micro:bit** with the hex file from **Activity 2: Avoiding obstacles** running on it
- A **PC** running Windows 7 of later, or a **Mac** running OS X 10.6 or later
- **Access to the Internet** (specifically, www.microbit.co.uk)
- A **Male to Micro USB cable** to connect their computers to your micro:bit. This is the same cable that is commonly used to connect a smart phone to a computer

If you or your students are using the BBC micro:bit for the first time, you can find more details about how to run scripts on the BBC micro:bit here.

Don't worry if you and your students have yet to receive your own BBC micro:bits, as many of the lesson's activities and outcomes can be replicated on the website's simulators.

How many students can participate?

It's completely up to you how many students you have participating in the session. We want to get as many students as possible engaged in this Live Lesson. Space and access to computers might be a consideration if you have a very large group.

How to prepare for the lesson

Before the lesson

Visit the BBC micro:bit website to learn more about the micro:bit and its functions and capabilities. If you haven't yet registered your school or obtained a login code, you can do so by contacting microbitsupport@bbc.co.uk.

There you'll also find some short videos to get started with the BBC micro:bit and information about the different code editors.

Even if you and your students have yet to receive your own BBC micro:bits, many of the basic tutorials, as well as the activities for the lesson, can be carried out on the website's simulators.

Getting off the ground

This segment of the Live Lesson teaches students about speed, and how you can measure it using your BBC micro:bit.

We'll be inviting guests from the Bloodhound Project to talk about designing a rocket-propelled model car, and the design principles involved in creating the fastest-moving rocket car.

For this segment, we'll be using **Activity Sheet 1: Getting off the ground**, downloadable on the Live Lessons website. Students will be tasked to evaluate three designs for a model rocket car and pick which one they believe will be fastest. Send the results of your students' vote to live.lessons@bbc.co.uk and see if they're correct when we test the designs live during the lesson.

The BBC micro:bit will be used to measure the speed of each model car, and demonstrate how computers can be used in testing real world systems and collecting data.

Curriculum links include:

Computer Science

- Computational abstractions that model the state and behaviour of real-world physical systems
- How data and instructions are stored and executed within a computer system
- Appropriate use of data structures

Mathematics

- Interpreting and manipulating algebraic and graphical representations of

data
- Using algebra to generalise mathematical relationships

Physics
- Speed and the relationship between average speed, distance and time (speed = distance ÷ time)

Avoiding obstacles

This segment of the Live Lesson explains some of the obstacles astronauts have to face in space, and how they react to it.

It introduces the concepts of reaction time, visual perception, peripheral vision and distraction.

Students will be tasked with playing a short game on the BBC micro:bit to test how quickly they can react to stimulus. For this, we'll be using **Activity Sheet 2: Avoiding obstacles**. You can find the hex file and activity sheet on the Live Lessons website.

If your students manage to have a go at playing the game before the Live Lesson, send a video of them playing it to us at live.lessons@bbc.co.uk and it could be featured on the Live Lesson. Please refer to our website for the full terms and conditions.

We also want to see how your students perform at the game, and generate a leaderboard for students around the country. Send in your students' scores before and during the Live Lesson and their names could be featured on our leaderboard.

Curriculum links include:

Computer Science
- Computational abstractions that model the state and behaviour of real-world physical systems
- How instructions are executed within a computer system

Biology/Physics
- How humans affect, and are affected by, their environment
- How the visual system works

Life on Mars

This segment of the Live Lesson invites students to think about life on Mars and exposes them to what scientists and astronauts need to know in order to determine if Mars is suitable for human habitation.

A key part of Mars exploration is the search for other life forms. We'll be introducing students to a system involving the BBC micro:bit that allows them to test their own physical environment for different life forms and alert them to their presence.

The hex file and activity sheet for this project will be posted on our website, to allow students to create their own system after the Live Lesson.

Curriculum links include:

Computer Science

- Computational abstractions that model the state and behaviour of real-world physical systems
- How instructions are executed within a computer system

Contact us

You can email any questions, comments, pictures and activity results before and during the Live Lesson to **live.lessons@bbc.co.uk**, or use the hashtag **#bbclivelessons**. We'll aim to answer as many of your questions as possible.

If you let us know if your school is planning to tune in on the day, your school name could be featured on the programme.

Thanks for your interest in our BBC micro:bit Live Lesson, and we hope you'll join us on the 7th of June.