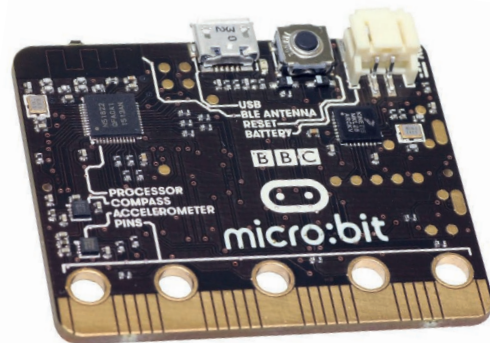


# BBC micro:bit: Spy Mission

Ian Philips, Haberdashers' Aske's Boys School



Like many schools across the UK, Haberdashers' Aske's recently received the much awaited delivery of BBC micro:bits. Having attended the launch event, I was aware of the potential of the device to be used across STEAM subject areas and the fundamental role it could play in helping the school deliver innovative projects centred on problem based learning and design thinking.

To make the most of this great initiative, my colleagues David Franks, Daniella Blyth and Vaughan Connolly and I, decided to have a special launch day, featuring a problem-solving activity which would engage the students in exploring the potential of the device in an open-ended and challenging learning situation.

Furthermore, to emphasise the importance of the day, we invited three keynote speakers to talk about the BBC micro:bit but also to use their industry experience to enlighten the students about career prospects in ICT.

The target group for this exciting launch was our Year 7 students and they responded with interest as our guest speakers Miles Berry (Principal Lecturer in Computing at Roehampton University), Craig Parker (Strategic National Business Manager for Schools and Further Education at Microsoft) and Genevieve Smith-Nunes (ReadySaltedCode), got the day underway with their inspirational talks.



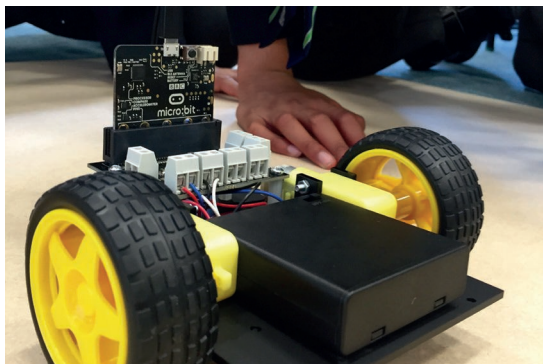
## Planning for the 'mission'

My colleagues and I planned the activity in consultation with students in Year 12, 10 and 9 to ensure that it would appeal to and provide appropriate levels of challenge for all Year 7 students. We wanted the students to struggle, to experiment, to meet obstacles and overcome them. This would help to build resilience, team working skills and instil a sense of achievement when the Year 7 students completed the 'mission'.

The design of the 'mission' was open ended so that students had to test, trial, continually review and make the project into an adventure in which they were immersed. To add more challenge, the task was presented as a competition with students organised in 5 teams of 15 (with each group of 15 split into groups of 2 or 3 students) to see which team could get their buggy to complete the course in the fastest time. This played into the natural competitiveness of most boys.

Healthy competition between the groups would be encouraged with the winning design from each group of 15 progressing to the final. This type of collaborative group work enabled the sharing of ideas and, importantly, reflected how this type of activity would take place within industry.

The students had two hours to complete the project. Their planning would be very much down to trial and error, with best practice being shared throughout the group. During the project students would be supported by members of staff, former students and the industry experts.



## Project Spy Mission

Using the Kitronik buggy and the BBC micro:bit the students were tasked to navigate a course to reach a special agent, "Agent Smith", who was trapped behind enemy lines.

Equipped with a detailed briefing document explaining their mission, the students were provided with code for making the buggies perform a range of movements. Students had to expand on this code via trial and error to complete the mission in the fastest time.

Mission success depended on:

- Students being able to make the buggy move for the correct distance by coding a loop correctly on the BBC micro:bit
- Ensuring the buggy could navigate the terrain. To do this students needed to code the micro:bit to make the buggy perform a series of turns in order to reach the destination. Entering the code in the correct sequence was mission critical!
- Students also needed to change the speed of the buggy using Pulse-Width Modulation (PWM). Students were given the code and then encouraged to experiment with it to see how fast they could make the buggy safely navigate the terrain.

## Evaluation

On-going assessment and judging learning outcomes alongside one's peers was found to be of great benefit to the students. They were constantly using and evaluating the code they had just written, sharing best practice within the group, and then trying again to either get it right or improve their buggy's movements. The levels of buzz, energy, on task chatter and enjoyment were high as they rose to the challenge.

The BBC micro:bit is a fantastic vehicle to use within lessons so that children can become problem/solution based learners. As a school we are currently developing a strategic plan for how problem solving based learning can be further implemented across the curriculum.

All learning resources associated with this project are available from 'Computing at School' and I would be delighted for you to use them with your students.



## Outcome

Would the enthusiasm for coding shown on the day continue? To test this out the students were given 'a call to action.' Rather than hand out the BBC micro:bit to each student, I gave them time slots after school to collect the device. Would they show? Were they sufficiently interested? I was delighted that 95% of eligible students came to receive their BBC micro:bit.



## Additional Information/Resources

Full learning resources for this project are available via Computing at School.  
<http://community.computingatschool.org.uk/resources/4508>

Resources for the project extension using a micro:bit to radio control another micro:bit are here (downloaded 191 times)  
<http://community.computingatschool.org.uk/resources/4518>

The Kitronik 'Line Following Buggy for BBC micro:bit' is available via the Kitronik website.  
[www.kitronik.co.uk/5604-line-following-buggy-for-the-bbc-microbit.html](http://www.kitronik.co.uk/5604-line-following-buggy-for-the-bbc-microbit.html)

A video of the day is available on YouTube.  
<https://www.youtube.com/watch?v=s5T9jHtGDU&feature=youtu.be>