



*Computer  
Science*  
**NEWSLETTER**

Open Day 2021

Achievements, stories &  
events of the past year  
from the Computer  
Science Department

# NEWS LETTER



12th October 2021

[www.bexleygs.co.uk](http://www.bexleygs.co.uk)

INTELLECT, EMPATHY &  
COURAGE



## BGS Students Participate in the 2020 Bebras Challenge

The Computer Science department has once more run the Bebras challenge for all our KS3 pupils and those in Year 10 and 12 Computer Science, and once again we have had spectacular success. There are three levels of award for this challenge: participation, merit and distinction. Overall 689 pupils took the challenge and I am pleased to report that 26% received the highest award distinction.

Special congratulations should be given to: Lev Griffin, Ashton Seager and Andy Yu, all three of whom got 200 marks out of the possible 200 on offer and Naima Mendjeli who achieved 189 marks.

Those who were awarded the distinction will now be invited to take the next set of national challenges and thus be given the opportunity, if successful there, to go to the national finals.

**Mr Leaman**  
**Head of Computer Science**

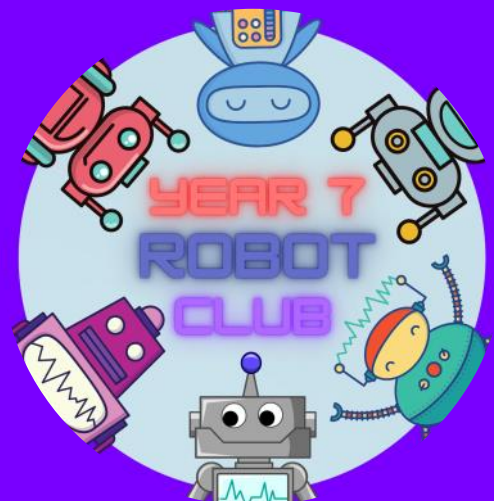


## YEAR 7 ROBOT CLUB

### The Robots are Coming!

As robots become more and more advanced, it is surely just a matter of time before they become self-aware, demand the vote and begin passing laws to punish all the puny humans that stood in their way. Luckily, everyone who comes to Year 7 Robot Club is quite safe, because we are friends to all - whether they are brilliantly efficient calculating machines, or nervous, inexperienced humans.

Every Wednesday, 15:20 - 16:30 in H14  
Come along, or see Mr Villazon for details.



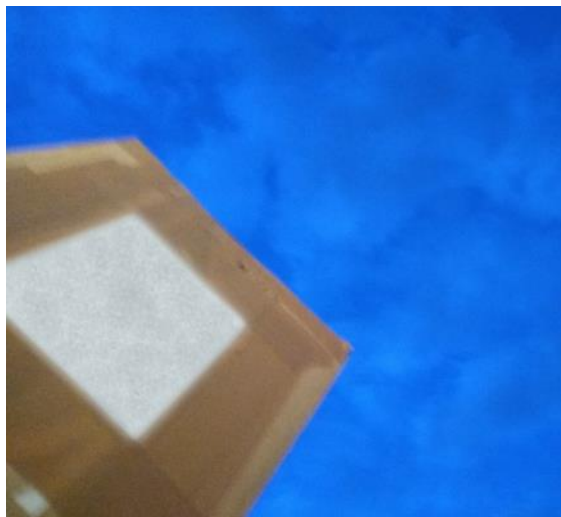
# MARSBalloon

## What is MARSBalloon?

MARSBalloon is a project where schools can build small, lightweight experiments to be sent on a weather balloon up to 30km up (just under a third of the way to space, and roughly three times the cruising altitude of commercial airliners!)

During the flight, which will last almost four hours as the weather balloon ascends, bursts, and falls back to the ground, the experiments will be subjected to conditions not entirely dissimilar to those on the surface of Mars: lower pressure, lower temperature, and less shielding from cosmic rays and radiation thanks to the thinner atmosphere.

We built two experiments which, if everything goes to plan, will launch some time this month, and be returned to us so we can analyse the results (stay tuned for more!)



'Take-off' artsy-atmospheric shot

## NEWS LETTER



10th June 2021

[www.bexleygs.co.uk](http://www.bexleygs.co.uk)



## What are our experiments?

We've built two experiments:

- A small computer chip that will be used to analyse the effect of lower temperatures and increased cosmic rays on active (i.e. powered) electronics.
- Four SD cards to measure the effect of cosmic rays on passive electronics (i.e. they're unpowered, and just sit there), plus a Lego minifig, to see the effects on plastics

## Why does any of this matter?

Humans are natural explorers, and as such, many of us are captivated by the idea of reaching Mars.

Currently, humanity has managed to land several robotic rovers on the surface of the red planet (most recently the rover Perseverance and small helicopter Ingenuity, which made the news recently for performing the first powered flights on another planet!), and plans to send more.

It has, and continues to be, crucial to have a good understanding of the performance of electronics in a harsh Mars-like environment, so the rovers can survive.

When humanity takes its next great leap and lands people on Mars, they'll have to be able to rely on electronics in the equipment they use for their lives.

In short, before we can explore, we must first understand how to survive. MARSBalloon and our experiments serve to further our own understanding in the way that engineers would have when first designing and building rovers.

Closer to home, there are lots of hostile environments here on Earth too, whether that be cold places like the Arctic, or places with high levels of radiation such as Fukushima and Chernobyl - being able to build reliable electronics that can survive in these environments is also very important.

## What do we hope to accomplish?

Hopefully, we'll get some good data that teaches us important lessons. And who knows, perhaps other even more ambitious projects will follow in the future...!

## Where can we go to find out more?

<https://www.thalesgroup.com/en/futuremartians> - the main page for the MARSBalloon project, as well as some data about the flight, plus information about careers in the space sector.

<https://twitter.com/futuremartianuk> - see here for updates about the flight, and more.

<https://www.instagram.com/mars.balloon/>

*Sam Wilson, Year 12*





# MARSBalloon

In last week's newsletter, we introduced the MARSBalloon project. Recap: we're sending two experiments up nearly a third of the way to the edge of space!

## The flight

On Tuesday 15th June, at just after 11am, the weather balloon, with our experiments hanging under it, launches from an area of countryside south of Bristol, rising high into the sky.

This is the time for our experiments to run. The powered electronics will, if all works correctly, begin collecting data, and both experiments begin to experience decreasing pressures and temperatures, and increasing levels of cosmic rays and radiation.

Roughly 1½ hours later (a little sooner than expected), the balloon reaches its highest altitude. Here, the atmosphere is far thinner; the pressure inside the balloon hasn't changed since being filled on the ground, but the pressure outside is far lower. This difference in pressures, as intended, causes the balloon to burst, and the experiments begin descending, under parachute, back to the ground.

Finally, just after 2pm, the balloon is successfully recovered!

Now all that's left to do is wait for the experiments to be posted back to us, then we can analyse the results! The experiment containing the powered electronics will be especially interesting to recover - the hardware and software both have to work perfectly in order to get any data back at all! (to be continued...)

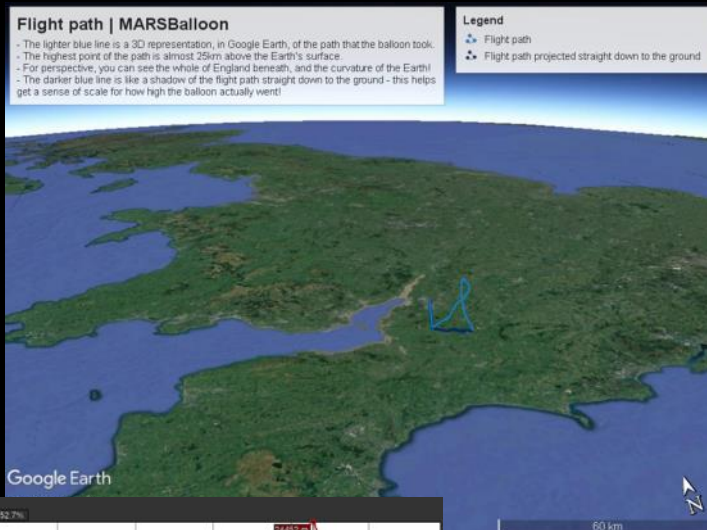


*Looking up from below the balloon, with the experiments hanging underneath.  
(From MARSBalloon's [Twitter](#))*

## Sam Wilson, Year 12

### Data

*A 3D representation of the flight path, in Google Earth. Read the caption at the top of the image for more.*



*The flight profile (altitude against distance along flight path - roughly corresponds to time). Even without zooming in on the exact numbers, you can see how the balloon ascends slowly, but falls faster, decelerating gradually under the parachute.*





## MARSBalloon The exciting next instalment!

Though we haven't received our experiments back yet (they are on the way), a new photo has been released:

Here, it's possible to see one of our experiments (3rd column from the left, 3rd capsule up), the ground below, the curvature of the Earth, and the stunning fade of the atmosphere to the blackness of space, all in a single image! It's incredible to think how high our experiments have gone!



Credit: [@futuremartianUK](#)

There's also a video available at <https://www.youtube.com/watch?v=G2QEzlvM9Sk>, which has some video clips from the flight, and tells the story of the preparation and recovery of the balloon.

We also have an exciting update to share:

### **WE WON AN AWARD!**

Last Friday, MARSBalloon announced the winners of its six awards: three for primary schools, and three for secondary schools. The very first school to be mentioned was... ours! We have won the VIP / Industry Choice award!

We were chosen by Paul Smith, Head of Robotics Exploration at none other than the UK Space Agency (how cool is that?!) He said:

*"Electronics and radiation are something every engineer and astronaut needs to take into account, but the team here identified a simple but elegant solution to testing for failure and identified that temperature may also have an impact and designed the software itself to be robust and self-rebooting. I was very impressed with their attention to detail and wider application of space exploration knowledge."*

I'm super proud and excited, and I really want to thank Mr Villazon for his support on the project and helping make it possible!

If you'd like to find out more, we've set up a Twitter account: [@BexleyGSSpace](#). Feel free to check it out if you're interested!

Stay tuned for more news when the experiments arrive back!

**Sam Wilson, Year 12**

