Y11 Gifted & Talented

In September 2010 a group of Y11 Gifted and Talented students who study Maths went to Keele University to see advanced Maths lectures and take part in activities designed to stretch their abilities. This visit also included an excellent opportunity for the students to visit a University and get an idea of what 'Uni' life is all about.

Most of 11Q/Ma1 had the opportunity to see a series of presentations that were aimed at encouraging young people to take up a career in maths by going up through higher education. It showed how cool and useful maths can be. It was a great day and just simply the experience of sitting in a lecture theatre was amazing!

At our first presentation we were introduced to the concept of code breaking and how it just wasn't a device used in James Bond. We went through the history of code breaking and compared codes and cipher as being like a lock and key. The Spartans apparently tattooed messages onto a slave's head and waited for the hair to grow back before sending them off to the person the message was for – obviously there was no sense of urgency! There are methods that can be used to help solve a code. One way of doing this is by knowing the most common letters used—for example 'e' is the most common letter and next is 't'. Knowing that some letters come in pairs ('q' and 'u' in English) and seeing patterns in the alphabet can all help. If it wasn't for codes and code breaking, history could have been very different. We got the chance to see a real enigma machine which was used by Germans in the Second World War. They are very rare and looks a bit like a typewriter which lights up different letters with a code so an 'a' could be 'u' then 'f' then 'd' and so on. There are three rotas used in the enigma machine and five to choose from. I thought how could something that is seemingly completely random be decoded the other end? The trick was to set the machines up exactly the same. So if 'hi' were pressed into the enigma machine and came out as 'bh' you'd write that down then pass it on and the other side would type in 'bh' and the letters 'hi' would light up on the machine. It was very complicated and clever. However, in Britain the code was broken during the Second World War in station 'X' now known as Bletchley Park. People like Alan Turing (the person who helped invent computers) were part of creating the machine. A huge clue was that 'a' was never 'a'. This machine was called the Bombe and

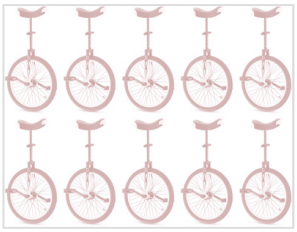
Winston Churchill believed that the code breakers of England and 'The Bombe' helped shorten the war.

Many of us think what is the point in learning simultaneous equations, angles in triangles and vectors? I cannot remember the name of the presenter for the life of me, but he explained that maths was something that was used in creating Google and some classic and very amazing games. The way in which normal search engines work is that they list pages and links that had the most links going into the site. Google however rates these links, for example if the BBC recommends something their recommendation is worth more than a small company, mainly due to the publicity of BBC. All the equations are simultaneous equations; at last maths in the real world!

Another really amazing use of maths is vectors in video games. Vectors can pin point a coordinate in three dimensions. Underneath the texture video games are made up of triangle mesh. The more advanced the game station and graphics, the smaller the triangles and the more triangle movement per second. Vectors also determine light and shadow on an object in the game to give the game the most realistic environment as possible!

All asteroids are built in triangles. When a bullet is within one of these triangles it makes up a perfect 360 degrees. This is how interesting and money making maths can be. Vectors and triangles are the basis of all games today! Another idea behind arcade video games is an algorithm for finding the shortest path between two points when there are obstacles in the way. In Pacman this algorithm is how enemies seem to be intelligent and make the game more challenging.

The last presentation was by Colin who well, basically juggles and can do all sorts of weird and wonderful things including riding a unicycle which you wouldn't necessarily think was connected with maths!



He showed us by using a ladder diagram which showed the pattern and position of three balls at any one time. If we look at how long each ball spends in the air an obvious pattern emerges. With three balls, each ball is thrown every third throw and since it spends one beat of time in the hand it must therefore spend two beats of time in the air.

It was an amazing trip and I can't even explain the tricks that he did, or how fast he can speak. It was a great day and it wasn't just people promoting further maths it was people showing their interest in maths and I think it was amazing. I hope you get the opportunity to go too, it was fantastic. Thank you!

An account of the day by
Emma Rich.
Grove School
Market Drayton, Shropshire