

EQUILIBRIUM

RHS AND THE COMMUNITY – KEEPING SCIENCE IN BALANCE

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Burton Dassett

By Rebecca Urosevic, 8SG



On the 19th and 20 June, Year 8 went to Burton Dassett. It was a great experience to be able to go to a different place I had never been to before, to learn new skills and develop the ones I had acquired already.

We were involved in a variety of tasks with different teachers, including Geography, Drama, Art and Science. We were put in groups and, along with a compass and bearings sheet, we had to navigate our way between tasks. The tasks were exciting and different, and taught us a lot; for example, in Art we learnt we don't always have to be really detailed in our art, because certain art can be free and loose. The tasks were organized in a fun way, such as Hide and Seek with a twist. We sketched each place we went to, something that represented the area we were in, and we filled in a part of the booklet we were given by doing a task. We spent half a day there doing 5 activities overall. I enjoyed every one of them because they were all unique and taught us at least one new skill each. It was also great fun to be able to do the activities with our friends and to socialise with people in our Year that we don't talk to that much.

When we got back to school, half of us went to Art and half of us went to Drama. I went to Art and we used our drawing which we'd sketched during the English task to create a design involving a sheep on Corel Photo-Paint. The Drama people also had fun doing physical theatre based on Shakespeare's "The Tempest". The Friday Art group spent the afternoon using batik.

I would like to thank everyone involved in organizing the day and who took the time to accompany us on the trip.

Spectacular Demonstrations

By Rhiannon Walls, Year 10

Last term, a group of students from Years 9 and 10 ventured up to Wolfson Lab, eagerly anticipating the 'spectacular demonstrations' they were about to witness. The demonstrations were carried out by Julie Pollard from The Institute of Chemical Engineers. They included the 'coke fountain', 'screaming jelly baby' and my personal favourite: 'the flaming hands' – watching the demonstrator's hands appear to blow up as a result of burning methane bubbles. Mr. Thomas's guest appearance in the 'flying cake bases', however, was certainly amusing.

The afternoon turned out to be fun, exciting and educational too! Thank you to Miss Gospel and the Science Department for organising such a great event.

Excitement of Science at the Royal Society, London

By Yr 10 Separate Scientists

On Tuesday 24 June, a group of ten Year 10 Separate Science students went to the Royal Society in London with Miss Gospel and Mrs Masterson. We spent the morning watching a crazy professor of chemistry, Dr John Kilcoyne, tell us all about the chemistry of life. As well as blowing a few things up, he demonstrated the effects of liquid nitrogen on various objects, which enabled him to hammer a nail into a piece of wood using a banana! In the afternoon, we listened to a marine biologist and a geochemist telling us all about the effects of climate change and what is being done to stop the environmental damage.

It was a great day, both informative and fun, and we'd all like to thank the Rotary Club, who organised it, and of course, Miss Gospel and Mrs Masterson, for going with us, and making our day even more fantastic!

Maths Community Update

By Jenny Mason, Maths Community Coordinator

During the Autumn term, some of our Year 11 students visited Bilton School to work with their fellow Year 11 students. They revised work for their GCSE and found out how useful it is to gain a qualification in Maths, looking at a wide range of topics at various levels and enjoyed some light refreshments together as an extra bonus. They found the work on proofs quite challenging and the afternoon "interesting" and "worthwhile". Students from Bilton then visited RHS for a KS4/5 A Level taster session during which they joined our Year 12 Maths students for their lessons with Mr Walker and Miss Boller and experienced work in the Sixth Form. There was very positive feedback from the students.

Some Year 9 students attended a lecture by Dr Jane Minihan about Engineering and what it is like to be an Engineer. Dr Minihan works for Meggitt plc (Dunlop Aerospace Braking Systems) and has a particular interest in promoting Engineering as a career. The students listened with much interest, as did I, and enjoyed learning about how the brakes on planes worked and the skills which were needed in that process. They greatly appreciated her visit and took the opportunity to ask her several questions at the end of the talk.

Ten Year 10 students applied to visit Dunchurch Infants School again this year, in order to produce two excellent Maths Magazines for their Years 1 and 2 children to work through, with our students supporting them. Our students worked very hard and represented our school very well. You can read Emily's report in this copy of Equilibrium.

I have been visiting Long Lawford and Wolston St Margaret's Primary Schools to give enrichment lessons and reinforcement work on decimals with the older pupils. The children worked very hard during the sessions and greatly enjoyed the experience of working through a task for a longer period of time – most of the morning.

At RHS, during the Spring term, Mrs Howes organized the UK Maths Team Challenge regional final and Helen has written about the day in this newsletter.

I joined the visitors from the partner schools in the Comenius Project and appreciated the opportunity to hear about the work they have been doing for the environment and accompanied them to Ryton Organic Gardens.

In June, Year 8 visited Burton Dassett Hills for a cross-curricular – Art, Drama, English, Geography, Maths and Science morning with Art or Drama as a follow-up activity in the afternoon. Again, there is a report, by Rebecca Urosevic, included in this copy of Equilibrium.

In July, the Maths Department and several of our students welcomed teams from our partner Primary Schools for a Maths Masterclass. The afternoon was fast paced with the pupils working very hard to complete a variety of rounds - their faces showed how much they were concentrating and that they thoroughly enjoyed the experience.

I would like to take this opportunity to thank all our students and those from our Partner Schools who have worked enthusiastically and hard to make this year such a success.

Visit to Dunchurch Infants School

By Emily Vincent, 10SE

On Monday 14 January 2008, a group of excited Year 10 girls travelled to Dunchurch Primary Infant School to watch and help the young children complete a Maths Magazine that our Year 10s had created.



This amazing project to create a Maths Magazine for two different Year groups in the Infant School was a once in a lifetime experience. During November the previous year, we visited the Infant School and worked with the children to get a first hand view on how the children liked to work, what kind of work they did, and how much they did. It was fun to help them with their work and it was very helpful to look back at the sort of questions that they worked on, as we hadn't seen those for a very long time! After an enjoyable morning we then had to return to RHS and continue our own lessons with more challenging problems!

Over the course of the Christmas holidays and early January, the small group of Year 10s worked extremely hard to produce a Maths Magazine, like the one we have at our own school, for the targeted age group of the primary school children. The finished products were two fun-filled magazines with colouring, sequences, counting and much more. We were very excited to go back to the school to watch as the Year 1s and 2s completed their own hard work. This part had to be my favourite as the young children's faces lit up when we returned to their classroom with the magazines we had created.

Sadly, the fun, games and colouring competitions could not last forever and soon it was time for us to return to our own school. We had a brilliant time and all agreed that the project had been a success – we had conducted research into the children's maths work, fashioned a Maths Magazine for them to complete and watched as our work was appreciated by all. All our teamwork had paid off.

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UKMT Maths Team Challenge

By Helen Ansell 9RB and Daisey Friend 9HBH

On Friday 22 February, Rugby High School hosted the regional heat of the UKMT Maths Team Challenge for the Rugby area. This involved teams from eleven other schools around the area. Each team is made up of four pupils: two Year 8 students and two Year 9 students. The day was split into four main events that were each scored out of 60 to give the final scores.

The first challenge was the Team Challenge. For this the whole team worked together on a set of 10 questions. It's up to the team to decide how they will be divided up but they have to try to answer as many questions as possible in 40 minutes. This event was fun and involved lots of paper flying everywhere as questions were passed around the table for different people to work on.



The next round was the Cross-Number. It is like a crossword except with numbers instead. However, it was not as simple as that because the team had to divide into pairs with one pair having the

across clues and the other having the down clues. But, to add to the challenge even more, many of the clues were dependent on the other pair's answer, meaning that there were only a couple of questions which could be answered straight away. Also, the pairs were only allowed to communicate through the teacher and were only allowed to ask each other to do certain questions. This made the round enjoyable but frustrating.

The third round was the Head-to-Head. This was a little bit like a function machine. The "in" value was given and the team players had to individually work out what was happening from the two "out" values given. For this event, two teams stood around one puzzle with alternating players from each team. This event was very hard because many of the functions are very obscure and hard to work out.

The final event was the Relay. For this, the team was, once again, divided into pairs. One pair was then moved to the opposite side of the hall for fairness. In each team one pair answered the "A" questions and the other the "B" questions. The A pair started with a question. If that was right or they got it wrong twice then they would then take the B team a question. This event was fun but frustrating when you are waiting for a question. It is very energetic because it involves lots of fast walking to collect and deliver questions.

Overall, the day was great fun and a great success. Well done to the RHS team who came third. The winners, Bablake School, will progress to the National finals in London in the summer.

Double Science Success in CREST

By Mrs Susan Mighall, Head of Physics

On Thursday 3 July, Science students from Year 9 and Year 12 attended the regional CREST (Creativity in Science and Technology) Finals at Birmingham University to present their science projects and compete with other schools across the Midlands area. The Year 9 students had produced a 10 hour project investigating whether expensive toothpastes and mouth washes were good value for money. The Year 12 students had produced a 100 hour project with ALSTOM Power about reducing carbon dioxide emissions by utilising the photosynthesis of broad leaf plants as their Engineering Education Project they had been working on with the assistance of Mr Thomas.



Hanna Moore, Philippa Barker, Jenny Bosher, Louise Young, Becky Morley, Sally Hall, Natasha Kilpatrick, Rachael Hodge, Jenny Eyre and Claire Hampson

The high quality projects were both fully rewarded with 1st place in their Bronze (Sally, Jenny E and Becky) and Gold categories (Philippa, Jenny B, Louise and Hanna). Both teams won £150 and an all expenses paid, two day visit to London to compete in the National finals in March 2009 where they will have the chance to compete for some incredible prizes. All the students presented high quality projects and Mrs Masterson and I had a really proud day and would like to congratulate all of them.

News from the Biology Department

By Jan Clemons, Head of Biology

A party of 38 A level Biologists with 3 Biology and 3 Chemistry teachers boarded a coach straight after school on 30 April destined for Leicester University. Here we attended a lecture on 'DNA fingerprinting, past, present and future' given by its inventor, Professor Sir Alec Jeffreys.

Despite knowing that the top floor lab is called the Jeffreys Lab our A level biologists have to study this topic as part of the gene technology section of the course. During their A level Biology course, our students have extracted DNA from Kiwi fruit by the same method employed in labs around the world and in another practical session transferred a bioluminescent jellyfish gene into bacteria, that as a result glowed bright green under UV light. Finally, using enzyme tools, the students produced a protein fingerprint from meat taken from different fish to show how closely related the different species are to each other in evolutionary terms.

Returning to the lecture, Alec Jeffreys admitted the path that led to the discovery of genetic fingerprinting began after getting a chemistry set at the age of eight. In 1984, at the age of 27, he discovered unique variations in DNA called 'minisatellites' (short DNA sequences) which differed in the number of repeats (or stutters) from individual to individual. His first case was a year later and resolved an immigration dispute followed by the first paternity case. In Sir Alec's words 'The floodgates opened' and for two years his was the only laboratory in the world who could do the work until ICI (now AstraZeneca) were granted a licence to carry out the work.

Sir Alec told us about the varied cases he had worked on and his technique was simplified and gave a pattern (similar to a barcode), unique to a particular person, which was suitable for forensic cases. Cases included the identification of Josef Mengele's skeleton, the identity of the children of the US President Thomas Jefferson by one of his slaves, profiling of rare bird species to see how closely related they were for captive breeding programmes, identifying a serial rapist in Leicestershire and identification of carriers of genetic diseases, to name a few. Today Sir Alec is investigating how DNA mutates and is taking genetic profiles of families living around the region of Chernobyl in Belarus.

The lecture was enjoyed by all and students commented it was a good 'refresher' on forensic biology, especially coming before public exams. There were lively discussions on the subject all the way back to Rugby. One good point raised by Sir Alec was 'Genetic profiling does not solve crimes. It establishes if sample X comes from person Y. It is then up to the court to interpret that in the context of other evidence in a criminal case.'

On the 8 May, two Year 11 Biology classes were involved in a 'newt swabbing' exercise as part of a national survey to assess the distribution of amphibian chytrid fungus in England. The fungus has been responsible for catastrophic amphibian declines in Australia, North, Central and South America and the Caribbean. The state in Europe is less clear but it has been detected in Cumbria & Kent, correlating with amphibian declines in these areas. The survey's aim is to see where else it may occur and the newt population at Rugby High School was chosen by the Institute of Zoology as a sample site.

Firstly we had to net 30 animals which was surprisingly easy and working in pairs, the students were told how to handle the newts and take a swab of the skin on the inner leg, toes, lower abdomen and the base of the tail using biosecure measures (wearing disposable gloves, disinfected sterile equipment etc). The students quickly became experts at very gentle newt handling because newts do not have a rib cage so care has to be taken that internal organs are not damaged by pressing their abdomens.

The aim was to dislodge loose skin which could harbour the chytrid fungus. Each swab was put in a sterile tube, sealed and labelled. The samples were posted to the Institute of Zoology where they will be processed to see if the Chytrid fungus DNA is present. Further samples will be taken in June by Year 12 Biologists as it is thought that the fungus can get better established during the warmer summer months but hopefully the newt population will be given a clean bill of health.

The students thoroughly enjoyed the newt swabbing and comments included:

- 'I really like newts and it's a shame that amphibians are declining'*
- 'Netting the newts as they came up for air was cool'*
- 'To start with I was worried about handling the newts, but soon got the hang of it'*
- 'The white flash on the tail is a good way of identifying a male great crested newt'*

Further information

- www.le.ac.uk/press/geneticshistory.html
- www.ioz.ac.uk/UKchytrid
- www.arguk.org.uk
- www.amphibianark.org

And Finally.....

To celebrate four years of Science Specialism we had a very special day during the last week of term – a big party! It was a day of fun, experiments and discoveries, party food and presents! We had everything, from reptiles and very large spiders to building rockets and journeying into the centre of our bodies via a large inflatable dome! Wallace & Gromit made an appearance somewhere along the way - and to top it all off – a fabulous Party Picnic, which, due to the fine weather, everyone enjoyed outside. A great day was had by all.

