



THE RAVENSBOURNE SCHOOL

STEM LEARNING

NEWSLETTER



Spring Term 2016

Welcome

Welcome to the second edition of the STEM (Science, Technology, Engineering and Maths) Learning Newsletter. I am delighted that so many staff and students are involved in STEM related activities across the School, a few of which are highlighted in this issue.

If you have an idea for a STEM related learning experience, please let me know, as we are always looking to expand our provision of activities for all students.

Mr Rew



The Spring Edition.....

Thank you to all students and staff who have contributed to this edition. In this edition, Miss Whitten writes an article on how to create a Pin Hole camera, Mrs Morrell discusses the highly successful 'Find Your Futures' event and Kate Woodbridge describes her experience of Forensic Science at King's College London. Have a go at creating your own Pin hole camera!

We hope you enjoy reading the second STEM newsletter.

Mrs Lindsey Hibbert, Editor
Progress and Achievement Manager



For the first time TRS has been taking part in the national competition run by Land Rover - 4x4 challenge. Students design and build a remote controlled car which will navigate an obstacle course under timed conditions. The team, comprising of Harrison Shea, James Valder, James Cain, Christopher Caden and Ritvik Danesh of Year 10 as well as Craig Butler in Year 12 hope to progress from the regional final to the national final, held at Land Rover head offices. This is an exciting competition to be involved in and a real opportunity for the students to show some critical thinking and take on some of the challenges faced in industry when completing a project in a short space of time.



The Year 12 BTEC Art students are currently completing their final stage of their ceramics project. They are working with a range of clays and decorating materials. It's a fine science which needs thorough exploration and experimentation in order to get the required effect. The students have been experimenting for some time with the different clays and their properties. One of the most exciting elements is using the glaze, which can be painted on as one colour, but when it is exposed to the heat of the kiln, a chemical reaction takes place and the glaze is transformed.

Mrs Kate Bayman
Progress and Achievement Manager

Pinhole Camera Challenge!

Pinhole Photography

A pinhole camera is a simple camera without a lens (camera obscura) and with a single small aperture. A pinhole is effectively a light-proof box with a small hole in one side. Light from a scene passes through this single point and projects an inverted image on the opposite side of the box which contains light sensitive paper. By using common household materials, you can make a camera that will produce pictures.

How to make a pinhole camera:

Step 1: Gather Materials

You will need a box, photo paper/film, a thin piece of metal like a can, tape, craft knife, needle, and sand paper.

Step 2: Make The Pinhole

The pinhole is like the lens of the camera. Poke a tiny hole in the metal with a needle and sand it smooth. Trim the metal so there is a little space around the hole



Step 3: Make Camera Box

You can use a shoe box, oat meal box or whatever. The box must be light proof. When the lid is on and the shutter is closed the inside is completely dark. The only light comes through the pinhole. Make sure there are no holes or openings in the box. Seal it and paint it flat black. Cut a small square opening in the box for the pinhole to go in.



Step 4: Place Pinhole and Make Shutter

Tape the pinhole behind the square opening. Centre the pinhole in the square. Then make the shutter which is just a flap that covers the pinhole from the outside. It can be made from some more tape, but must be a black tape like electrical or duct tape.



Step 5: Load Photo Paper

This must be done in complete darkness. You can make a darkroom in a bathroom or closet and use it for developing and changing paper. Tape a piece of photo paper to the inside of the box across from the hole. Put lid on and make sure the shutter is closed. Now you can go out in the light.



Step 6: Taking A Picture

Point the camera at what you want to shoot. It works best when it is bright and sunny. Depending on lighting and clouds hold shutter open for 30 seconds to 4 minutes then close. Everything has to stay perfectly still. Go back to the dark room and take paper out to develop.



Pinhole Questions:

What is a camera obscura?

Draw a diagram of how a pinhole camera works.

Why is the image inverted in the box?



Miss Paige Whitten
Art and Photography

Recent Events

On the evening of 22nd October 2015, TRS launched the Find Your Future event for all Year 11 students and their parents. This was more than simply a careers fair, designed to inspire students to consider and begin to research a range of careers and gain an insight into the routes, demands and rewards of different careers.

The event was hugely successful with over 85% of students attending with their parents. The evening was divided into various "Inspiration sessions" whereby different professionals from a range of industries delivered workshops to the students and their parents. These workshops offered real insights into the nature of the career, the realities of the job and the pathway towards achieving it. In addition to the workshops, TRS also provided a Level 6 careers advisor on hand to speak with parents and students, and a variety of other professionals provided informal talks and insights through exuberant and interactive stands in the Small Hall.

There were a range of careers represented throughout the evening, from a District Judge to West End Theatre Directors, as well as an impressive array of professionals within STEM related pathways, such as:

Sue Alexander – the Principal Biomedical Scientist at the Royal Marsden Hospital

Sue and Daniel Harvey - Founders and practitioners of their own Chiropractic Surgery

Dr Patrick Jones – the Admissions Tutor for Biochemistry at Imperial College London

Dr Joanne Matthews - a Highly Specialised Cardiac Physiologist at Kings College Hospital Foundation Trust

Ross Price – a Structural Engineer

Matthew Steer – a Trade Finance Officer for Bank of America and KYC specialist

The evening was a vibrant and popular event, where many proactive students also utilised such an experience to gain exciting work experience within some prestigious careers. Parents and students came away able to discuss possibilities and aspirations, with many students inspired to research new avenues or pathways that they had not considered before.

Mr Rew said of the event; "It was a wonderful success; many students were hugely inspired, and even those who did not find the career that they felt was right for them yet, students were able to rule out what was not for them, and feel motivated to start researching fields that might be."

Mrs Morrell

POST 16 Progress Leader/Careers/UCAS

Recently occurring at Parliament was the *Big Bang Fair @ Parliament* (rather ironically) on the 5th of November. I was asked to present my hydrogen fuel cell and electrolysis project to visitors of the show from organisations including: GlaxoSmithKline, BAE Systems and STEMNET. I explained my project to these people and others - and after a House of Commons session ended – MPs including Robert Neill MP (Bromley and Chislehurst) and Clive Efford MP (Eltham). Both were interested in my project and expressed their concerns and suggestions for the future of fuel and travel; not only the use and subsequent integration of hydrogen as a source of energy for the future, but the renewable sourcing of this that must be both carbon-effective and cost-efficient for such a scheme to be successful and beneficial for tomorrow.

To present a project on the terrace of the House of Commons – overlooking the Thames – was excellent and I am currently undergoing the process of improvement to my presentation, based upon the feedback I received. The promotion of STEM subjects for years to come is vital and such an event is encouraging to the scientists and engineers of the future that STEM subjects are vital to the development of the modern world, and making the UK a world-leading, innovative nation. I wish all of the other competitors good luck for the National Science and Engineering Competition in March 2016.

William Fall 100D

POST 16 Work Experience



During September and October, I was fortunate enough to take part in a series of Forensic Science workshops at Kings College London. With thanks to Mr. Rew, who was aware of my passion in Forensics, he managed to get me in contact with a leading lecturer who teaches Ph.D. students Forensic Science. I had the opportunity to take part in 3 lessons: the basics of Forensic Science, Blood Pattern Analysis and Fingerprint Analysis.

'The Basics of Forensic Science' was primarily focused on the analytical Biology and Chemistry within Forensic Science. I learned how to use a pipette properly, with specialist "Gilson pipettes". This was a great opportunity, especially as our school isn't equipped with these high-tech facilities. Also, I learnt how to make chemical buffers and how to analyse chemicals within their journals. This was important, as it can help me identify how dangerous some chemical substances are, and as a result what precautions should be made before, during and after handling them.

In Blood Pattern Analysis, we learnt that identifying bloodstains at a crime scene can be crucial evidence for a case. The pattern of blood can help distinguish the weapon, the angle of attack, and when the crime actually occurred. During our experiments, we used horse blood as it is the most similar to human blood. We looked at how height impacts the pattern, by dropping blood droplets from different heights on the flight of stairs. We looked at different weapons, and how they produce different patterns of blood when hit. We did this by covering the weapons in blood, and (safely) hitting them on a large white sheet of paper. We also looked at how blood settles in pools on different fabrics, and the effect of dropping blood at different angles. This is all key information, which would be essential to SOCOs (Scenes of Crime Officers) if a crime was to occur and blood splatters were a key piece of evidence.

In my final workshop, I learnt about how to analyse fingerprints by their characteristics. I learnt that fingerprints are made up of particular 'ridge endings', and if these imperfections are found, they can be matched to a database. In this workshop, I completed questions sheets which are given to real job applicants who aspire to work in this field. We then looked at real-life case studies, where we were presented with the criminals fingerprint markings from the crime scene and also from the police department. This was interesting as we could see how real Fingerprint Analysts examine fingerprints at a crime scene, and how they can successfully link this to the individual who conducted the crime. All of these lessons were conducted by ex-Metropolitan Police, who had a number of years in this field, making these lessons far more inspiring and motivational.

As a result of this work experience, I have gained transitional skills which will aid me during university and my future career. Also, saying that I have had work experience in my UCAS application has given me two unconditional university offers, and given me something additional to put on my CV. I am very fortunate to be given this experience, considering that Forensic Science is a difficult field to get into – and work experience is limited as the field is so confidential. The things that I have learnt will be a benefit to my Biology A-level, as well as my Extended Project, and I am very grateful to have been given this opportunity.



Kate Woodbridge 13BI