



Greenford High School

Sima Bhudia D&T Deputy HoD and Sushila Hirani, Head of D&T, Faculty of Visual and Performing Arts

Greenford High School is a non-selective, mixed comprehensive in Ealing with approximately 1,800 students. We are an 'outstanding school' and one of the top 5% of schools in the country based on progress made at Key Stage 4.

The department – Sima Bhudia

After attending a Design and Technology Association training course regarding the new specification, Andy Mitchell, Deputy CEO of the Design and Technology Association suggested we tell our story to inspire other teachers. We were devastated to learn how many schools are struggling to keep D&T alive due to reduced curriculum time, budgets, limited resources including teachers and the number of students taking D&T at KS4. At Greenford High School, all these are true except one: the number of students taking D&T at KS4 has increased to 68. It occurred to me how fortunate we were and teachers at the course asked how we were doing this. Obviously, many factors contribute to the success of our department, for example, strong school leadership and Head of Department, meaning that the subject is being valued, enabling us to deliver a well-rounded educational experience.

Another reason was the initiative promoted by the D&T Association, providing schools with £250 to spend on a range of projects, part of the 'STEM in to Action' project. This inspired us to modify the way we deliver D&T. This initiative involved three meetings where various projects were demonstrated that could be implemented at Key Stage 3. I believe that the implementation of this initiative has meant that students are inspired to choose D&T in our school.

Curriculum time for KS3 is over two years, with Year 7 being taught in 100-minute lessons, and Year 8 have 200-minute lessons each week, both for half of the year. Since last year the subject areas we



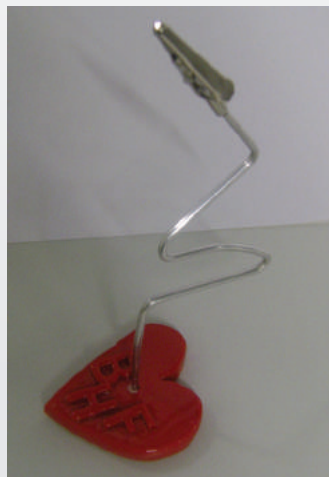
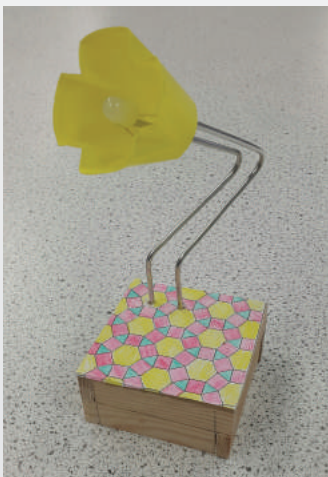
predominantly teach at KS3 are graphics, food technology and resistant materials, each taught in six weeks. Textiles is no longer taught, but we have still tried to equip students with the basics in a single lesson.

Since attending and implementing STEM into Action we developed and amended the projects in line with the new specification. This has been hugely successful; we had applied the STEM in to Action philosophy that students need to experience and learn through using design theory and mini design and make projects.

Our projects Product Design

Year 7 students create a picture/note holder to raise money for a charity of their choice. They learn to understand the design process by researching, developing a specification, designing in isometric, using 2D Design to create a paper template and hand tools to shape the product. They use the vacuum former and jigs to understand batch production. MDF, HIPS and aluminium are used to develop knowledge of properties of materials.

In Year 8, students learn about real-life applications of biomimicry, mechanisms, inclusive design, programming and manufacturing an LED lamp. Programming was developed by attaching the Crumble to a pre-bought buggy.





In pairs, students program a range of outputs and manoeuvre the buggy on a predetermined path. The application of programming is instant and they enjoy the competitiveness that the task offers. This is also then used as part of STEM club, where students freely explore the software.

The LED lamp project enables students to use a range of materials, processes and basic electronic components. They begin manufacturing a box using a halving joint and apply a top with a tessellated pattern. They then use a jig to bend two uniform aluminium rods and attach an LED and battery pack. Pre-made moulds enable batch manufacturing of a range of lamp shade designs from which students select.

As part of the new specification, mechanisms is taught through a traditional mechanical toy. Students design and make a mechanical toy that reciprocates, and through the planning process gain knowledge of motions, cams and their application in the real world.

Food Technology

Year 7 students are introduced to healthy eating through the Eatwell Guide and basic nutrition. They gain knowledge and skills through different ways of preparing and cooking different food types including the application of heat and testing and evaluating food products. They understand scales of production in the food industry, including the use of CAD/CAM and they investigate and design different Italian food products.

In Year 8, students learn to create and develop different food products for a variety of dietary needs as well as gaining an understanding of sustainability associated issues in agriculture, horticulture and seasonally grown food. They conduct user-centred design by investigating different dietary needs



and the nutritional value of different food groups. All students develop their skills in the kitchen by taking part in a range of focused tasks. The recipes from the tasks can later be adapted to make them appropriate to individual dietary needs. They then test and evaluate these to improve the sustainable aspects and see if they are commercially viable.

Product Design (Graphics)

Year 7 students design an educational board game and are introduced to graphical and ergonomic layout of information through creative design and modelling. They create prototypes, using programs such as Fireworks and 2D Design and use CAM manufacturing processes (laser cutter) and the strip heater to create counters. They select and investigate a cross-curricular educational topic to produce an original and fun board game which will be tested and played in classrooms. We are hoping to introduce the BBC Microbit as the dice.

In Year 8 students are introduced to simple motors, designing and constructing 3D nets using 3D mathematical modelling and develop an understanding of card engineering and hand and digital graphical layout using a range of manufacturing processes such as nets and slots and tabs. They learn how to design creatively through 3D prototyping, modelling, constructing and assembling using CAD/CAM and 2D design.

Promoting D&T

Every six weeks we celebrate the success of a selection of students from each class and they are sent a postcard home. Praise throughout lessons, parents' evening and one-to-one acknowledgement of success is important. A five-minute presentation at 18 weeks allows teachers to explain the GCSE course content and enables students to ask questions about the course and careers in design and technology. Finally, students' achievement is rewarded through a trip to Cadbury's world, Legoland or Kidzania. At GCSE and A' Level we include visits to industries such as BMW and Wenzels, and exhibitions such as New Designers.



Women's British Airways Engineering Workshop and Careers Event

STEM into Action – Sushila Hirani

As Head of Department and Lead for STEM, I guide teachers to relevant projects, resources and events to enable them to enhance their curriculum teaching, raise attainment and provide students with relevant STEM experiences and access to career pathways. With the Deputy Head of Curriculum I've presented STEM project plans to the senior leadership team to get funding which supports the STEM clubs which are now well established across all key stages.

My vision was to get all four subjects to work together in attracting students (particularly minorities and girls) to pursue STEM as a path towards Engineering at A Level, apprenticeships and university. This has been fully supported by the Head and governors which has had a huge impact in the way STEM is embedded in our school culture.

I encourage teachers to develop a cross-curricular programme, for example the D&T and Computer Studies departments working closely together, linking the D&T curriculum with the theory and skills in the ICT curriculum. Mindstorms First Lego League club is in its fourth year now, in which the school's teams came first in the presentation category in 2015 and 'Core Values' in 2017.

The KS3 STEM club is in its fifth year with projects run across all the STEM subjects. One is Snap Circuits where students create a range of circuits using different components where they follow coordinates, learn the components' functions within circuits and replicate real life systems such as a burglar alarm.

Greenpower Racing is an international competition involving the design and build of electric cars. Half the Post 16 team has been girls which has been a major achievement. Last season's team achieved the Gold CREST Award which is a first for us.

Organising and running STEM trips has been a key feature in promoting the subjects and careers, especially to girls in engineering. These included the Women's British Airways Engineering workshop and careers day and The British Army STEM Surge Event targeted at Year 10 girls.

Making parents aware of students' success in the STEM clubs, competitions and trips is extremely important to promote engineering as a viable career path and the school website and Twitter are used to celebrate students' activities and projects. We had 27 Post 16 students in 2017 go on pursue engineering at university.

Thanks to our colleagues Pravina Varsani (D&T teacher), Stuart Prentice (technician), Edouard Kouakou (food technician) for their dedication and hard work, and the continued support from Paul Manby, Amandip Johal (Deputy Heads) and Mathew Cramer (Head Teacher).



Team Zeus at their first race at Rockingham race track. Leadership, teamwork, problem solving has been an essential part of this project