



MARCH 2016
ISSUE 2

NOWER HILL HIGH
SCHOOL

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gramme in registra-
tion

Series 2: STEM work-
shops for Year 9

A day in the life of an
Optometrist/ Clinical
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Girl's STEM reward
trip to see "Hidden
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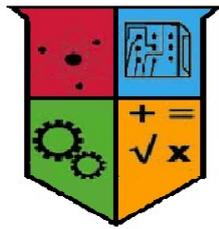
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STEM
SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS
AT NOWER HILL HIGH SCHOOL

Nower Hill students design Train prototypes in whole day STEM workshop

Nower Hill was extremely pleased to work with the Smallpiece Trust, to offer our Year 9 students a whole day STEM workshop.

Sixty Year 9 students, who have shown an active interest in extracurricular STEM events, competitions or clubs were selected to take part in the whole day workshop on Thursday 16th March 2017. The STEM day involved students working together in small groups on 'design and make' projects to improve their creative thinking, problem solving and team working skills.

Students worked to design a prototype for a Train. The activity was geared to complement the National Curriculum in Science, Technology, Engineering and Maths. Students were asked to engineer a prototype, incorporating a motor/pulley system, gears and a strong enough structural frame to withstand the journey. While many students were initially daunted by the deliberate lack of instructions, we were extremely proud of how they all rose to the challenge.

Every group was able to design a distinct prototype, which they tested throughout the day on the provided tracks. Students used laser cutters to design an aesthetically appealing body for their train. Many used their learn-pads to research fast trains around the world, and adapted current designs to construct their own stream-



KS4 students working in groups to engineer their designs.

lined shape.

Students then presented a pitch to their peers, discussing their design, its aesthetics, calculated speed and costing.

Chanel Green, the Educational Officer running the session, fed back "Nower Hill students are diverse in their skills and

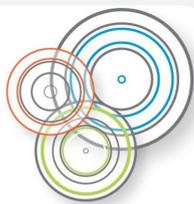
strengths, and I am extremely impressed by the teamwork displayed today. Every group built on the strength of their peers! While some students excelled in their role of 'accountant', ensuring their design was cost effective and would still enable the 'company' to make a profit, others were able to incorporate these figures into an articulate pitch- fearlessly given to their Year group, who were no doubt supportive! Every group was able to work collectively to construct an innovative design. Very impressed with the work ethic and articulation of Nower Hill students".

Please congratulate all students involved, for beautifully demonstrating the Nower Hill values, while challenging themselves and producing some phenomenal work.



**Year 9
students
designing a
train
proto-
type**

Secondary Engineer Leader's Award



Primary, Secondary
and Advanced
Leaders Award

"For me personally, I used to think of engineers as men who worked with machines. This year, I've realised it is so much more than that! An engineer is just someone who solves problems- I can do that! I've done that in the workshops! My entry was aimed at helping young people with mobility disabilities play video games" Ifrah; Year 9



KS4 and KS5 students attending the third lecture of the "a day in the life" program.

The Secondary Engineer Leader's award is working in partnership with University College London (UCL) to deliver the annual "What would you do?" competition. This year Nower Hill students have worked very hard to take part in the national competition, with the hopes of their design being built by UCL Engineers.

Students in Years 9, 10, 11 and 12, were supported by their Physics teachers, to develop a solution to an every day issue. Students were asked to identify a problem in the world; some chose an issue that is faced by all, a certain age group, or a certain group of people (e.g. those with a particular disability). Students were then encouraged to use their problem-solving and engineering skills to design an innovative solution to their identified problem.

We were very impressed by the ideas proposed by our students, and are in high hopes that they will be rewarded by the "Secondary Engineer Leader's Award" body. Our students aspired to alleviate issues ranging from manual dexterity to drink-driving.

One design proposition across the United Kingdom will be picked by the Engineers at University College London, and be developed into a prototype. Our students constructed annotated diagrams, and a pitch letter for the Engineers, with the hopes of further developing their ideas.

Chris Noone, Leaders Award Project Coordinator, has been liaising with the school and is very excited to award certificates for our students' entries. He has commented, "It's great to see so many students taking part, and is a testament to the school. The competition forces

students to make cross-curricular links within the STEM subjects, while developing problem-solving skills and articulation. It is vital that students are able to articulate their ideas, and the proposal letter challenges them to do this. Some of these entries sound phenomenal and our team of Engineers are excited to work their way through them!"

The project coordinator has been so impressed with the hard work, and innovative thinking of our students that he has introduced us to some Engineers who would like to further enthuse our aspiring engineers. Selected students, who have demonstrated innovative thinking and articulated their ideas beautifully, will be chosen to have a drop in question and answer session with Stephen Galagher- a Formula 1 Mercedes Engineer. We endeavour to support our budding Nower Hill engineers further!

A day in the life of an Optometrist

Nower Hill is pleased to be running their "Day in the Life" programme for the second term of the academic year. Every month, Nower Hill has an external guest speaker from a STEM profession, to inspire our students and make them aware of the opportunities available.

On February 3rd, a qualified Optometrist came in to Nower Hill to speak to our students; with an excellent turn out of just over

35 students attending.

The Optometrist (graduate from City University London) was incredibly enthusiastic, bringing along anatomical models of the eye (and some optometry themed gifts for our students!). She discussed case studies, and how Optometry can involve the diagnosis of neurological diseases, and even some forms of Cancer. Our students were fascinated by the issues discussed, as was evident by the lively question and answer session which followed.

Farah Khatri, the Optometrist, commented that she was very impressed by the calibre of questions.

"It's a great program [day in the life], I am glad that students understood why a detailed knowledge of the anatomy is needed for this profession; it is so much more than watching a patient read letters! Their questions after the session, showed me they were thinking about the applications of the STEM subjects in this profession"~ Khatri

Student's written feedback included how "interesting" it was to hear about the Optometrists experiences; with some now "very interested in pursuing a career in Ophthalmology" and others in "Optometry". We are very proud of the interest, and enthusiasm shown by our students for this programme, and believe it is vital to inspire our students with real life applications of STEM.

A day in the life of a Clinical Trials Manager

The day in the life programme was delighted to have Clinical Trial Co-ordinator (Ihtisham Malik) and Clinical Trial Manager (Hassan Nawrozadah) present “a day in the life” of their professions on March 13th.

different phases of a Clinical Trial, and the importance of testing efficacy and safety. Many were fascinated by the “Elephant Man Trial”, which inspired an interactive question and answer session on the dangers of Clinical Trials.

Our guest speakers asked Year 9 students to demonstrate randomisation in a Clinical Trial, with a coin flip and chocolate (!) resulting in a lively discussion about ethics.

Mr Malik discussed how “a day in the life” of a Clinical Trial co-ordinator differed to that of a Clinical Trial Manager. Students were made aware of the importance of both roles, and how each required different strengths.

Students were made aware of the importance of STEM in the field of Clinical Research, and how statisticians (and Mathematics) are vital in the collection and analysis of data.

“So impressed with Nower Hill students– what a fantastic programme. Thank you for having us! An absolute honour to give students an insight into our profession. It’s so important that students see real life applications of Science and Maths. I was so impressed with how well they articulated their ideas on the ethics of Clinical Trials”~ Malik

Our guest speakers ended their session with an interactive quiz, assessing students on their understanding of the various aspects of clinical trials. Emily, Kanusha, Keira and Aschvin (in Year 9) provided some brilliant answers– winning some prizes from Mr Nawrozadah. Nower Hill students were very articulate in the questions posed to our external guests; where questions ranged from the most emotionally taxing avenue of the profession, to the importance of communication between medical and research staff.



Students attending the “day in the life” of a Clinical Trial manager event

“The presentation was really informative and surprising! I was taken aback by how much effort and time is spent developing a drug”

~Emily, Year 9

Our two guest speakers, provided an interactive and engaging session, discussing the history of clinical trials (the work of James Lindt), and the role of clinical trials in modern medicine and research. Students listened avidly to the

A day in the life of a Materials Engineer

As part of the “day in the life” programme, Engineers came in to Nower Hill to speak to our students on January 13th. We are pleased to say we had an excellent turn out of nearly 50 students attending the after-school lecture.

The three Engineers (graduates from Queen Mary University London) discussed their research projects in the final year of University, and their Industrial experience. The two female engineers stressed the importance of young women entering the engineering profession.

Ms Amarachi told students that when she started working in Industry, her place of work had no

female toilets (other than on the administration staff floor).

She told Nower Hill students that modern women are challenging stereotypes, and actively changing the face of the industry. She was pleased to elaborate, the drastic change in male to female staff ratio has caused her place of work to change their facilities and recognise the role of women in industry. One female student (Year 10) commented “it was funny to hear that! It made me want to be involved in a career that is not female dominated! I want to be part of pushing the boundaries of Engineering and challenging stereotypes!”

Ms Rehman, discussed the thrill she felt when first seeing a ‘naked’ Jaguar car. She elaborated with the examples of fascinating research of her peers and a range of case studies. Our students heard how a PhD student at Queen Mary has recently discovered a blue-tack like material,

strong enough to attach furniture to the ceiling.

The engineers were very impressed by our students, and the calibre of questions they posed.

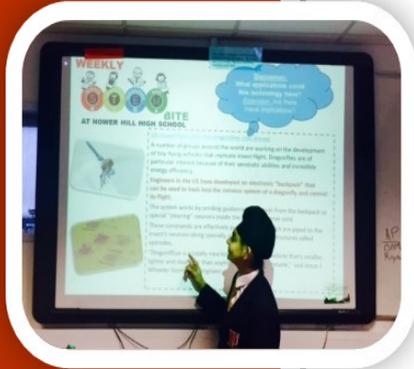
“The experience was an absolute pleasure. I was incredibly impressed by the number of students taking an active interest in Engineering, and it was refreshing to see so many female students. The standard of questions was fantastic, and I would be honoured to take part in the programme again!”~ Rehman

Student written feedback included how “beneficial” it was to hear about the Engineers experiences. In addition, students found it particularly “helpful that they talked about easy ways of arranging work experience”, while others found the case studies and examples “fascinating”.



KS4 and KS5 students attending event

“Weekly STEM bite” programme



Sam (STEM ambassador for 9FN) discussing the potential applications of “Firefly technology”

“The car our group designed was the fastest, it travelled all the way down the Science corridor. It felt good to take concepts I’d learnt in Physics, including mass and forces, and apply them to engineering!”
Dev; Year 9

Nower Hill introduces the “STEM bite” programme currently being used with Year 9. At Nower Hill, we aspire to demonstrate the vast scope of applications of STEM to our students; ranging from the surgical field to commercial or military applications. Year 9 Form Tutors, with the assistance of selected student STEM ambassadors, are now delivering a weekly “STEM bite” in registration. Their objective is to inspire students that have entered KS4, and illustrate the applications of the STEM subjects in real life.

Each form receives a “Weekly STEM bite”, where a breakthrough has been made via the STEM subjects. These include world wide examples of ingenious in-

ventions engineered to alleviate problems. Students have discussed engineering focussed on applications in third world countries (such as specialised wheelchairs); the design of robotics and its novel applications in cataract surgery, and even the development of a “backpack” which can control the flight of dragon flies by tapping into their nervous system (turning them into drones!)

Year 9 students have had the opportunity to sign up as STEM ambassadors for their form, and deliver this session on a weekly basis to their peers. Discussion in form has been incredibly impressive, with ambassadors collating ideas for the allocated “discussion point” of the week.

“My favourite article so far has been the use of robotics in surgery. I want to be a Dr, so it was interesting to see the massive role technology can play in the medical field. I really enjoyed discussing the advantages and disadvantages of the breakthrough as a class.”
~Sahana, Year 9

Students are encouraged to discuss the applications of the research in question, and how it incorporates the STEM subjects. Form Tutors have fed back that the STEM ambassadors have shown great enthusiasm, and encouraged their peers to be actively involved in debates/discussions.

Year 9 “STEM Workshops”, Series Two complete

Nower Hill designed a six session series of STEM workshops. Our objective was to inspire students that have entered KS4, and provide them with a platform to make cross curricular links across the STEM subjects.

Year 9 students were given the opportunity to sign up to the series; and attended sessions after school on Thursdays. The sessions were designed to challenge stu-

dents, stimulating investigative and problem-solving skills.

Following the success of series 1, many of the sessions were incorporated into series two of the workshops (with a new cohort of students). Students experienced numerous engineering styles, including: materials engineering (testing the tensile strength, and absorbency of materials, for a raft in a flood) and chemical engineering (where they created “bath bombs”). Students have also completed various engineering challenges; including designed a cargo-drop. Students attending are taking part in weekly challenges, with the best engineering designs for the scenario being awarded first prize.

For series two, an additional challenge was incorporated; students were asked to design a car (using

metal sheets, wheels and a range of allocated resources). The design had to incorporate a means of being pumped (with an air pump) down the Science corridors. Students competed in groups to adapt their designs to be increase acceleration. Our team of KS5 technicians assisted in running the session, even including their own car for the race (!)

We are very impressed by the teamwork demonstrated by the Year 9 students involved, and are excited to see how students involved in the next series (series 3) execute the challenges posed.

Thank you to our STEM ambassador Krusha, who has attended all sessions and supported the students taking part. She has shown an infectious amount of enthusiasm, and facilitated students developing their problem solving skills.



Year 9 students testing their air pumped car down the Science corridors

Hidden Figures: Trip for Year 12 Girls

On International Women's day, 8th March, the Maths Faculty organized a trip for female students in Years 12 and 13.



Dorothy Vaughan, Kathryn Johnson, and Mary Winston Jackson, who inspired the film "Hidden Figures"

Fifteen female students were accompanied by five members of staff to see the inspirational film "Hidden Figures"; the story of a team of African-American female mathematicians who served a vital role in NASA during the early years of the US space program.

At Nower Hill we are very proud of the number of girls who go on to study Maths at A Level, and endeavour to support and inspire them further. It is vital that our students are provided with positive female role models, and are able to recognise the many contribu-

tions women have made to Mathematics and industry as a whole.

We hope that this trip, where the stories and struggles of Dorothy Vaughan, Katherine Johnson and Mary Jackson were told, is an inspiration to our female students.

"The movie reinforced the fact that to succeed in maths or a maths based industry, gender does not matter. Girls can succeed as much as boys! I found it inspirational!" ~ Thilaani (Year 13)

UKMT Intermediate Challenge

On February 2, Nower Hill students sat the UKMT Intermediate Challenge. The UKMT Challenges are lively, intriguing papers designed to stimulate interest in maths. Although 'UK' stands for United Kingdom, the test is sat by students all over the world, so it's a great chance for Nower Hill mathematicians to test their mettle against the world.

This is the largest of the three UKMT Challenges and Nower Hill students acquitted them-

selves admirably. A phenomenal 55 percent of NHHS students (94!) achieved either gold, silver or bronze awards versus 40% that are awarded across the entire population. In addition, based on their exceptional scores, a dozen students have been invited to sit further 'Kangaroo' papers.

Please especially congratulate Emily Darnell (Year 9), Amina Abdelmoumene (Year 10), and Abbas Kassam (Year 11),

who achieved the best marks in their Year group.

"The IMC was fun but the Kangaroo paper even better. Since it was pitched specifically to our Year group the material was more accessible, although still very difficult!" ~Ibraheem (Year 9)

V Van Pelt
Teacher of Maths, Whole School Numeracy

Message from NH STEM ambassadors

This term we have been actively involved in the organisation of the "Day in the life" series of lectures.

Sixth form STEM ambassadors: Kajani, Saorla, and Krusha

give Nower Hill students an insight into their careers. At our

monthly talks, we endeavour to have an open dialogue with students from younger Year groups and have been collating their feedback after the lectures. It has been an insightful experience, and we are so excited to see how helpful students are finding the programme.

We have also been assisting with the Year 9 workshops, and are very pleased by the

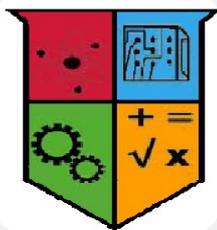
enthusiasm students are showing. This is exactly why we applied for the role of STEM ambassador!

We are currently in the process of organising a whole school House STEM competition with Ms Anwar, so we would like to encourage all students to take part after Easter.

Read our next issue to hear about the winners!



Upcoming events



Our next issue of "STEM at Nower Hill" will include a competition to be run by our sixth form STEM ambassadors, "Women Of the World". Students will be asked to research a woman who has excelled in her STEM field and contributed to the world. Please encourage your son/daughter to take part, by researching a "WOW" (Woman of the World) and explain why she is inspirational. Form Tutors will be giving more details about this

competition after Easter! Our dedicated team of STEM ambassadors endeavor to keep you up to date with the upcoming STEM projects and competitions, introduced to KS3, KS4 and KS5.

We hope to update you soon on the winners of these competitions, upcoming guest speakers (organized through the "a day in the life" program), and the exciting sessions that will have taken place in the STEM workshops.

Next term, as part of our "a day in the life" program, we will have a

Dentist (Dr Ur Rehman), and two Microbiologists from UCLH. We look forward to their inspiring lectures, which we hope our students will be inspired by. Please encourage your son/daughter to attend.

Sign up to the STEM workshops will continue in S5, for the next series. Sessions will involve numerous engineering challenges.

There will be many upcoming STEM events, whose details we hope to share with you in our next issue.

Extracurricular STEM sign-up



STEM Workshops

The Science Faculty would like to invite Year nine students to sign up to the **next series of STEM workshops**.

There will be six sessions running Thursdays 3:20-4:15

Sessions will include engineering solutions to various scenarios. These include: scenarios of water engineering, chemical engineering, and mass production engineering.

Please see Ms Anwar (S5) to put your name on the list if you would like to join as places are limited.

Architecture Club

Are you interested in finding out more about Architecture?

The DT department will continue to run a club on **Wednesdays during lunch time after Easter**, where we will be making architecture models and learning about our built environment.

Please see Ms Francis to put your name on the list if you would like to join as places are limited.

LEGO Donation request from Technology Dept:

Following on from our STEM day workshop, the Technology dept. are inspired to incorporate some of the ideas from the SmallPiece Trust into Nower Hill extracurricular activities.

If parents would like to donate any lego, please ask your son/daughter to leave donations with Ms Francis. Alternatively, please drop off at reception.

Thank you in advance for your support