WILMINGTON
GRAMMAR SCHOOL FOR BOYS
FORWARD THINKING - TRADITIONAL VALUES

ENGINEERING FOCUS

MARCH 2013

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Trevithick's Industrial Dartford 2013

NATIONAL CHAMPIONS

Turbocharged National Champions in the Bloodhound SSC Class

HEADING FOR TEXAS

Red Shift take third place in the F1 in Schools National Championships

Turbo Charged

At the regional finals

Wind tunnel testing the aerodynamics

Turbocharged is the WGSB team of six students who took their car to the regional finals and won.

Taking part in the Bloodhound SSC class the team is challenged to design, build and race a Bloodhound car, linking with the upcoming British attempt on the World Land speed record, with the Bloodhound SSC project .

Samuel Webb, Ben Harvey, Brecon Hoadley, Morgan Fifield, Billy Moss and Prenavin Mudaly took up this challenge after learning all about the F1 in Schools during their enrichment week activity.

Each team member has a specific job to do, whether it is raising sponsorship from local companies, working on publicity and pit displays or designing or manufacturing the car. Success comes from their ability to work to the strength of each team member and to support each other in this huge task.

The regional finals were held in February at City University, London and competition was strong. This was the first time Turbocharged had been at the finals for this event and the pressure was immense.

After a day of demonstrating, testing and judging the results were announced and Turbocharged were triumphant taking Fastest Car in the Bloodhound Class and First Place overall winners—They were going to the Nationals!!

"Once we understood how to use Solidworks the design of the car evolved easily"

Sam Webb

Turbocharged Team Manager

Turbo Charged

At the national finals

Turbocharged geared up for the national finals by working late every school night and every Saturday between the regional and the national finals.

They felt even more pressure as the whole of year 8 were due to be at the Big Bang Fair on the day they were competing meaning that all of their friends and classmates were there to see how they did.

After a 6.30am start they headed up to the excel Arena in London excited and exhausted after the mammoth task they had undertaken of re-designing and manufacturing their car to make sure they succeeded at the top level.

Judges scrutinised their car, their pit display, and their portfolio. The cars were tested on the 20m track and the team demonstrated their detailed knowledge of the engineering behind their success.

The tension rose as the prizes were awarded at the end of the day—

Best Engineered Car

New Speed Record

National Champions

Turbocharged Triumphant!

Teams were judged for their engineering knowledge

Ready to race

Red Shift

At the regional finals

The winning car design for the regional finals

Red Shift have been taking part in the F1 in Schools competition for some time, each year learning from their experiences, and building on their successes.

They have moved from the Bloodhound SSC Class on to the senior F1 class and in doing so have found the time to support younger teams that are working at the school.

Alex Lines-Headman, Dan Spiteri, Ben jolly and Ed Honey attended the regional finals in February with their latest design complying with all of the regulations of the much more stringent F1 class.

With an increase in the number of schools taking part in the F1 challenge the standards were extremely high. Only two teams would be going through to the National Finals at the Big Bang fair in March.

Red Shift had worked hard on all aspects of the challenge and their pit display was so professional it was stunning.

Their accumulated knowledge from this and the previous years of competing impressed the judges and the team were confident they would do well.

In the best traditions of teams from WGSB Red Shift celebrated receiving

Best Engineered Car

as an accolade to the quality of their work, then the cheer raised the roof when they achieved 2nd Place -

Reg. Finals Runner Up

They were through to the national finals with the prospect of heading to the world finals in Texas firmly in their sight.

"Just to get to Texas alone is an excellent achievement!"

Dan Spiteri

Red Shift Team Manager

Red Shift

At the national finals

From the very moment they realised that they were going to the national finals, to compete against the best in the country, they knew that the car needed to be improved dramatically.

Luckily from their research and analysis, they knew the key areas in which to improve the design. After further development and testing, the team implemented their new, innovative ideas into their final design. Attempting to achieve the full potential of the car by reducing the overall drag by 2.5%. Would this give them the edge to achieve fastest car?

Once again the national finals were held at the Big Bang Fair the day after the Bloodhound SSC class finals. Having been to the event the day before to support Turbocharged they knew exactly what to expect.

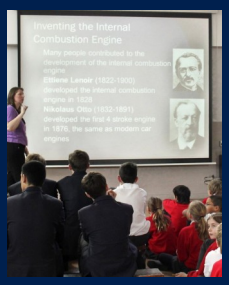
Judging was intense, when you looked at the displays from the competition you knew it was going to be close. The cars were being tested throughout the day, but many of the teams had been at the National Finals before.

Red Shift raced and made a good time but were disappointed not to have achieved fastest car. The prospect of Texas seemed to be slipping away. One after another the awards were presented without success, but then the ones that counted. Bronze place goes to

RED SHIFT!!

They're going to TEXAS!

Bloodhound SSC Inventions and Discoveries



Introducing the Bloodhound project

Students demonstrate concepts

"This science was fun and amazing"

Year 5

Anthony Roper Student

As part of our Bloodhound SSC outreach work this year Wilmington Grammar School for Boys has developed an Inventions and Discoveries Science Fair.

This was in response to a request from Anthony Roper Primary School to visit them with something based on this years National Science and Engineering week theme - Inventions and Discoveries. Our activity invited students to take part in hands on tasks to help them understand some of the basic scientific principles and inventions that will help the Bloodhound SSC reach 1000mph.

Our opening presentation showed videos and demonstrations explaining the aims of the Bloodhound SSC project and gave a context for the topics the students would find out about during the event.

Students moved around the carousel of activities in groups of 5 or 6 and learnt about aerodynamics, drag and thrust in more detail from our STEM leaders.

The team of year 10 engineering and electronics students that accompanied me to run the fair did a fantastic job working with small groups explaining how things worked and why they behaved the way they did.

During the event Anthony Roper students received raffle tickets for asking or answering questions and getting involved in the tasks with Bloodhound SSC. Prizes being awarded to those students whose raffle tickets were selected from the hat.

I would like to thank Wendy Pike from Anthony Roper Primary School for letting us work with her students to develop this project and for giving us such fantastic feedback so we can improve the activity for the future.

Be part of the adventure

Students record the names of the inventors

Students take part in hands-on activities

If you are interested

- This is a free activity aimed at students in year 5 and year 6.
- To run the activity we need to use your school hall and have access to tables, electric sockets, a computer and projector.
- A maximum of 45 students can take part in a 90 minute activity

If you would like more details about the activity and to discuss whether it would be suitable for your students then please do not hesitate to contact me on 01322 223090 or by e-mail at esmith@wgsb.org.uk.

We are currently offering to run this activity on a Friday afternoon but if this is not convenient please get in touch and we will discuss alternative possibilities.

Bloodhound SSC is a great adventure—be part of it!

Students get to grips with the new Bloodhound SSC jigsaws.

Bloodhound Blast

Update from Bloodhound

Introducing Bloodhound BLAST, our free online community for explorers and educators from 4 to 104!

EXPLORE - Register in our Global community to have fun exploring the world of science and technology; learn, create, share, watch, experiment and discuss. Be creative, be inventive and post back your ideas with the record, upload, link and forum features. This is the best of social media, video and blogs in a secure environment.

GUIDE - For all Educators and our STEM Ambassadors. Register for topic and subject resources and activities to use and develop. Put yourself on the BLAST map. Network and collaborate locally and globally with schools and colleges around the world on projects, ideas and experiences. Enjoy open access to our video libraries and use our built in functions to record and edit your own content, to upload files, post links or open a debate.

"Join BLAST and share your knowledge and passion with the world in our global community "

Jo Finch

Education Animator and Ambassador Trainer

Bloodhound SSC

Cisco BLOODHOUND SSC Global Video Competition

The Cisco BLOODHOUND SSC Global Video Competition is designed to offer an opportunity for young people to demonstrate their skills in Creative and Digital Media and to share their skills and understanding of the Bloodhound Project.

The competition hopes to build a bank of short, informative films that can be shared with the rest of the Bloodhound Education Community and gives students an opportunity to research, direct, film, present and develop pre and post production skills using the best technology and software available to schools and Colleges.

There are four entry Categories for the Competition that are open to any school or College registered on the Bloodhound Education Programme (http://www.bloodhoundssc.com/education)

The prize for the competition is truly unique; an opportunity for the winning Team to visit and view a Bloodhound UK Low Speed Run in late Autumn 2013. It is likely that the UK Low Speed Runs will be in the South West (details to be confirmed). All category winners will have their videos aired at the Goodwood Festival of Speed in July 2013 and the teams will be invited to come to Goodwood, meet the Team (including Project Director and former World Land Speed Record holder, Richard Noble OBE) and create a video diary of their visit.

Helmet Design Competition

Bloodhound SSC Needs YOU!
What should the helmet of the man driving the fastest car on Earth look like?
We just can't decide.

So... we need you to use a bit of colour, a dash of imagination and your creative flair, to design a helmet for Bloodhound SSC driver, Andy Green, to wear on some of his runs both in the UK and South Africa.

The competition is open to students of all ages in schools and colleges in the UK and South Africa

Two overall winners (one from the UK and one from South Africa) will see their designs adapted by a top professional helmet designer and put onto a helmet, which will be worn by Bloodhound SSC driver, Andy Green.

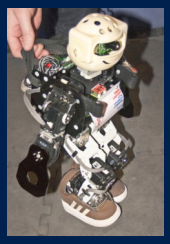
The winners will also be invited to attend one of the BLOODHOUND SSC test runs and their schools/colleges will receive a visit from the BLOODHOUND Education Team.

Download the Helmet Design Template from our website and work your magic!

Deadline – Beginning of May
Contact Details - helmetdesign@bloodhoundssc.com

Big Bang Fair

Henry mixes up a Rubik's cube for the Lego robot to unscramble



Members of Plymouth University show off their footballing skills

"My son found the visit educational and enjoyable....the perfect combination"

Year 8 Parent

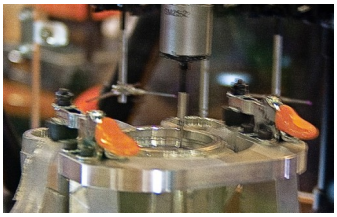
Students try their skills with new technology

The Big Bang is the largest celebration of Science, Technology, Engineering and Maths for young people in the UK. Everything they do is aimed at showing young people just how many exciting and rewarding opportunities there are out there for them.

We took the vast majority of year 8 as well as the year 10 engineering diploma group to this fantastic event to encourage them to think about careers in STEM and find out just how diverse this group of subjects can be.

The event was divided into 8 zones looking at all aspects of STEM (Science, Technology, Engineering and Maths) with representatives from schools, universities and industry demonstrating what students could get involved with.

Students of all ages were extremely excited to try out the different hands on activities. Whether it was controlling one of Plymouth Universities



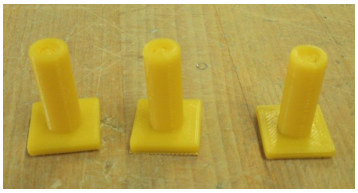
400mm high robotic footballers or taking the Computer Measuring Machine challenge with Renishaw they all learnt how engineering fitted into all aspects of industry.

One of the most surprising things to see in the middle of all of this technology was a Bald Eagle from Eagle Heights, Eynsford. A magnificent bird of prey demonstrating how we can preserve and learn from nature when we are changing our world. One primary school teacher actually asked whether it was real! Believe me, having watch it beat it's huge wings I knew that it was. Having said that it would have been just as amazing if it had been an animatronic looking so realistic.

I had a long conversation with Oscar the Sellafield robot, he was there to explain why the nuclear industry makes so much use of robotics, programming and safety protocols to keep producing our energy without harming our environment. Particularly relevant as Britain will soon be building the first of a new generation of nuclear power stations.

This event was exciting, mesmerizing, fascinating and inspiring. I believe that careers in any of these industries would be absolutely excellent and I hope that this opportunity has given our students the chance to think about how they will use their STEM learning in the future.

3D Printing

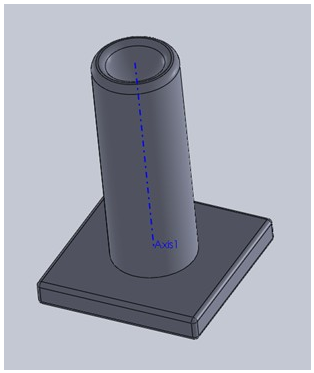


Through the generosity of Bits From Bytes the school received a 3D printer when it became a Bloodhound SSC Education Centre last year.

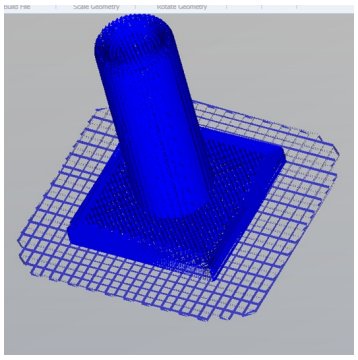
Many people have asked how we have used this modern technology and the answer is anything from A-level Graphics prototyping to making aerofoils for our F1 in Schools teams and everything in between.

The 3D printer is usually used for prototyping parts, allowing students to quickly check shapes and dimensions before spending long periods of time manufacturing a finished product. It can however, also be used to create complex parts that would be difficult to manufacture using conventional equipment.

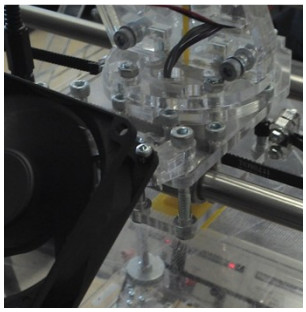
This example is from Josh Brown's A-level Systems and Control project which needed several buttons that contained several inconvenient shapes. Josh decided to 3D print these, manufacturing all 3 in only 1 hour, instead of spending several hours turning them on a lathe.



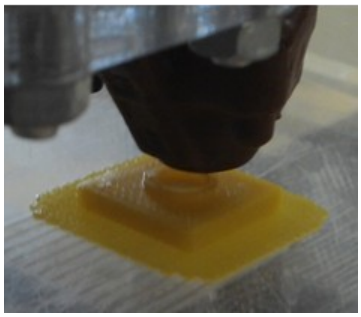
The first stage is to produce a 3D image using our CAD software, Solidworks. This allows you to visualise the design in 3D and edit the image easily if dimensions are incorrect or the shape is not quite right.



This image is exported into Axon the software driver for the 3D printer and students decide on the quality of the finished item.
The software simulates the manufacture on screen ensuring the correct settings have been selected to achieve the desired outcome.



Once this file is saved to a memory stick this can be transferred to the printer and manufacturing can begin.
The machine lays down a 'raft' which is the bed that the object is going to be printed on, printing each slice of the product one on top of the other.

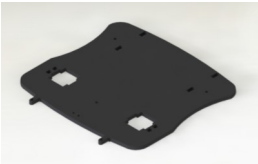


To speed the machine up you use thicker slices, but this gives a poorer quality finish.

As well as Systems and Control projects the Graphics groups have benefited from this unique piece of equipment. Mr Baker produced a Solidworks model of the I-pod Nano which, when printed in 3D, even has a working clip. Students then designed and manufactured suitable protective packaging for the Nano integrating the use of this and other CAD/ CAM equipment. Using the accurately printed 3D Nano model students could test the accuracy of their work.

This helped them develop their core design skills as well as enhancing their understanding of Solidworks and how to edit files in CAD as well as the importance of accurate dimensioning when designing and building interlocking parts.

Students are just starting to unlock the answer of what this machine can do and it would seem the use of the printer is only limited by their imagination.



Michael Jarvis produced a buggy chassis for his EPQ

"One day companies like Organovo may be able to simply harvest a grown adults' stem cells from a blood draw, use a specialized 3D printer to build an organic, polymeric scaffolding in the shape of the organ or tissue that needs to be replicated, and literally grow a kidney, heart, lungs, within a matter of days or weeks."

Brad Hart

Forbes

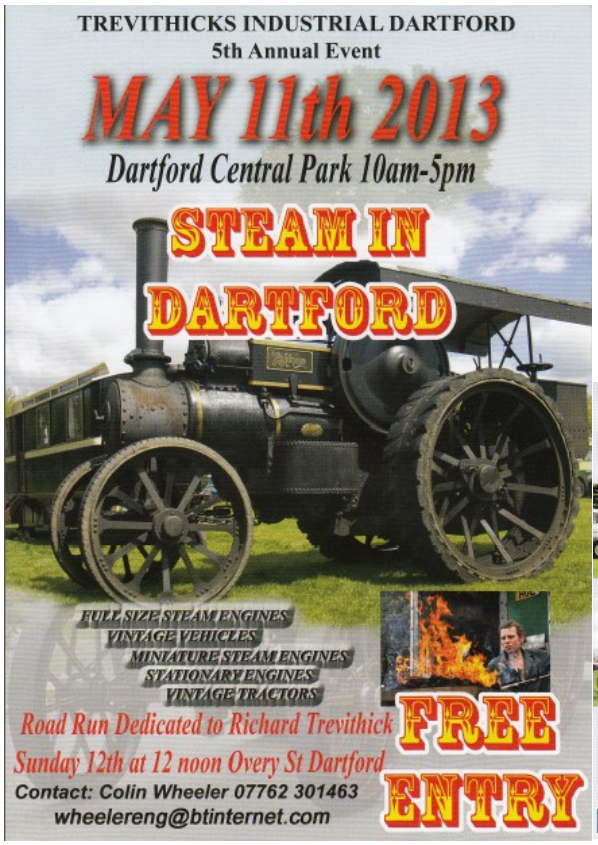
INTERESTED?

smallpeice

Year	Subject	Location	Cost	Places	Availability	Dates
Year 9 13/14 yr old	Marine Technology	University of Southampton	£175	100	Places available	9th - 12th July 2013
Yr9, 13/14 yr old	Railway Engineering	University of Bath	£95	100	Limited places available	2nd - 5th July 2013
Year 10 14/15 yr old	Electronic Engineering	University of Portsmouth	£175	60	Places available	24th - 27th June 2013
Year10 14/15 yr old	Marine Technology	University of Strathclyde	£175	40	Places available	21st - 25th July 2013
Year 11 15/16 yr old	Low Carbon Energy Challenge	Newcastle University	£225	50	Places available	22nd - 25th July 2013
Year 11 & 12 15-17 yr old	Mobile Communications	Cardiff University	£275	40	Places available	24th - 27th June 2013
Year 11 & 12 15 - 17 yr old	Railway Systems Engineering	University of Birmingham	£225	50	Places available	15th - 18th July 2013
Year 12 16&17 yr old	High Speed Communications	Aston University	£175	28	Places Available	8th -10th July 2013

If you are interested in the Smallpeice Trust courses go to
http://www.smallpeicetrust.org.uk/index.php?option=com_timetable&sort=position&Itemid=183

The courses above had spaces available on 25th March 2013



FIRE YOUR ENTHUSIASM AT TREVITHICK'S INDUSTRIAL DARTFORD

This is the 5th year that the Trevithick's Industrial Dartford event has run in Dartford Central Park and Wilmington Grammar School for Boys have been there since the event began.

This is always an excellent event and we look forward to seeing you in the Education marquee where we will have hands on activities relating to engineering for all ages to try.

Look out for our full photo report in the next issue.

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