



ENGINEERING FOCUS

JULY 2012



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WHAT A YEAR!

Engineering Focus was launched at the start of this academic year to celebrate the work students do within the STEM subjects (Science, Technology, Engineering and Maths) and let people know about opportunities available to them in the future.

A newsletter that was meant to be printed 3 times a year is now onto its fifth issue and we still haven't fitted a lot of the things that have happened this year in. In fact, I already have three articles for the October issue. In addition the Engineering Focus website has been designed to support students and schools with information about all of the different projects they can get involved with.

The WGSB Primary outreach Programme was updated for this year and as a result 5 new primary schools have been added to the list of schools that our students visit and support with STEM projects.

Other big initiatives this year include the Caterham Car project with students from across the year groups working on its assembly. Whitecode, one of our main sponsors are providing us with an array of solar panels which, once fitted will help with STEM research and our ever increasing energy bills.



The Caterham is coming together nicely



Bloodhound SSC Show car at the launch

Work has carried on in our role as Regional Centre for Primary Engineer with some fantastic results, including our introduction to the education team at Bloodhound SSC. As a result we launched as the Bloodhound SSC Education Centre for the South East in February and had visitors and students in awe of the full size mock up of the 14m vehicle.

To give an idea of all of the work that the school has done as an engineering specialist school and Primary Engineer and Bloodhound SSC regional centre I have put a calendar of events for the year in this issue and even that is not complete.

I am looking forward to increasing our links with schools and the local community through new initiatives during the next academic year and I will do my best to keep you informed. If you have any ideas please contact me at esmith@wgsb.org.uk

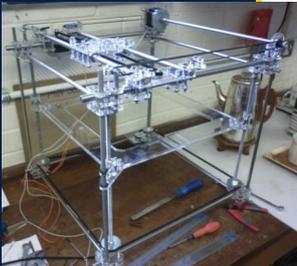


WHITECODE
DESIGN ASSOCIATES

3D PRINTING IS HERE!



Getting started



Almost there!

“The person who has never made a mistake has never made anything”

Mr Winter



Our Pro-duck-tion!

The Honda Civic—
Built at Swindon



February saw the launch of our Bloodhound SSC Education centre and with it a new focus in school for our STEM projects.

Bits From Bytes is a company who work closely with the Bloodhound team and when they found out we had become a centre offered us the kit to build a Rapman 3.2 3D printer.

The wait for it to arrive seemed never ending but when it finally arrived we opened the box and found the real challenge had just begun.

This fantastic printer is made up of over 1000 parts that have to be assembled with

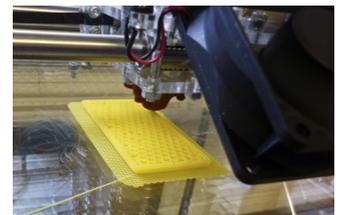
meticulous attention to detail. Josh Brown a year 11 Diploma student offered to take on the challenge and after several days working 8-6 he finally powered up the printer to produce the test pieces.

There was huge excitement in the DT office as the first ‘raft’ was printed and this was soon followed by—a duck! A little tweaking made sure the printer was running smoothly and soon Josh was away. We have a family of ducks, a pair of daleks, a tardis and some small Egyptian sphinxes.

This printer is absolutely amazing and we want to express our gratitude to Bits From Bytes for their generosity in donating the printer to the school and also to thank Aaron

Thorogood for his support with the software needed to convert files from Solidworks to Axon, the driver software for the printer.

Now that we are getting used to how this fantastic piece of kit works we are starting to develop drawings to convert and print so that we can demonstrate this new technology to our students and our visitors as well as using it to produce aerofoils for our FI in schools car and components for our A-level students.



HONDA'S SECRETS

On Thursday 19th January at 5:30am, a group of 24 year 11 Engineering diploma students from WGSB travelled to the Honda UK manufacturing plant in Swindon.

Honda is one of the world leaders in car design and manufacture and has a reputation for reliability in all of the different models they produce.

Their state of the art manufacturing facility was a perfect place to find out about large scale

manufacturing systems, automation and quality control systems.

After a presentation about the work of Honda UK and the running of the Swindon Plant, we had a guided tour of the extensive manufacturing facilities.

Students were given the opportunity to see the production lines working, and saw the new Civic being built just weeks after it was announced to the world.

We also visited the engine workshop and saw the Honda FI engine made famous by Jensen Button.

Other highlights included the largely autonomous robotic weld shop, the interior trim assembly line and a Q&A session with several associates.

The visit was extremely informative and motivating giving all of the students a better insight into how such companies work. Seeing the manufacturing facilities first hand made it so much easier to comprehend the stages and processes involved in producing such a complex piece of machinery and an idea of just how much work goes into producing the latest Civic.

TRIP TO DISNEYLAND— WE WERE WORKING, HONEST!

In February this year some of the Sixth Form students from WGSB went on a trip to Disney Land Paris.

Although we did go on the rides these were not the main reason for this trip, we were in fact there to see the science lectures that were being held daily.

We attended three lectures during the trip which were given by scientists from the Royal Society and performed in front of over two-hundred students.

The first was on mass and volume and how these variables are related. The

lecturer explained to us how animals such as insects are able to survive falling from the tops of buildings when humans are not. The second lecture was on robots and how they are getting smarter and more sophisticated. The final lecture was on technology and how the increase in media information and technology is affecting children and how they develop. These were all very insightful as they looked at areas of science that we don't look at in school.

We spent our free time during the days in the parks, trying out all the different roller



coasters and rides. We had an excellent time on this trip, however, the best part was when we were waiting for the next Disney character to appear to get our photo taken with them...and it was Mickey!

In a queue where the average age was five it is safe to say that we were the most excited.

By Josh Cross

“We need to make sure we keep the car ‘pointy-end forwards”

World Land Speed Record Holder

Andy Green



BLOODHOUND SSC UPDATE

TAKEN FROM ANDY GREEN'S DIARY <http://www.bloodhoundssc.com/news>

Andy Green, driver of the Bloodhound SSC is one of many members of the team who upload diary entries to the Bloodhound SSC website. The following sections are taken from his latest entry.

“The design and build of the Car is progressing well. BLOODHOUND designer Mark Elvin has been working closely with Hyde engineering to complete the design of the upper rear chassis and fin structure. This is one of the last major bits of chassis to design and Hyde is proving to be a great partner for us. They've been pestering us for ages to get

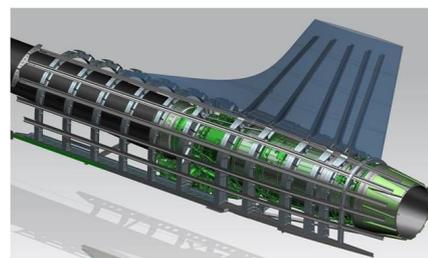
started with fabrication, so finally we're keeping them busy.

We need to make sure that the Car will stay 'pointy-end forwards' by keeping the aerodynamic centre of the car behind the centre of gravity. The rest of the design needed to be mostly complete before we knew where the centre of gravity of the Car would be, and hence how big the Fin would need to be: the bigger the Fin, the further back the aerodynamic centre is. This is the last piece of the puzzle and we're just about ready to start making it, which is great. If you've already put your name on the fin then this is where it will go – and if you haven't, now's the

time to register so that your name can travel at 1000 mph! “

If you would like to put your name on the fin then go to www.bloodhoundssc.com/

This is only a small part of all of the information about progress on the design and build of the car and I would thoroughly recommend visiting the website to find out more.



TREVITHICK'S INDUSTRIAL DARTFORD



Colin Wheeler's Foden Wagon



Miniature Steam Engines

"All men by nature desire knowledge"

Aristotle



Scale model of a Clayton Wagon

A 1933 Austin 7



For the fourth year Dartford Central Park has become the meeting place of old and new.

Trevithick's Industrial Dartford is a free event held in Dartford Central Park with the aim of showing people the industrial heritage of Dartford and just how important Dartford's engineering roots are in the modern industry we have around us today.

Visitors to the park were able to see full size and miniature steam engines as well as vehicles from Dartford's history.



This included a Hallford Omnibus built by J&E Hall from 1906 and the Leyland Borough of Dartford Fire Engine circa 1939.



Richard Trevithick was a brilliant engineer and invented the high pressure steam boiler as well as the first locomotive and the Cornish boiler.



As well as the steam engines and miniatures there were also a wide range of vintage vehicles on display and touring the park.



SHOWING US OUR ENGINEERING HERITAGE ENCOURAGING OUR ENGINEERING FUTURE

Staff and students from **Wilmington Grammar School for Boys** attended the event for the fourth year.



Our display in the school marquee included information about the Bloodhound Project. We had activities for our young visitors to try. As a



Bloodhound SSC education centre the activities centred around this huge engineering project. Students were able to make retro rockets, balloon



cars and k'nex cars. Testing the cars on our portable track.



We also displayed work from previous shows including the model of Trevithick's 1804 loco that we built at Trevithick's Industrial Dartford 2009. Quite a challenge for the students that attended that year.

“The problem with this country is that profit has replaced passion”

Colin Wheeler

TREVITHICK PROJECTS

We have always had students at the Trevithick events, and each year they have taken on a different engineering challenge.

They have built models of the Trevithick 1804 loco.



Produced a pair of microsteam cars.



This year they built Stirling Engines, based on a design found on the internet at Www.scraptopower.co.uk

WHAT HAVE WE BEEN DOING?

Date	Students Involved	Activity
27/09/2011	Yr8 WGSB	Teentech - An activities day held in Tunbridge Wells giving students the opportunity to take part in interactive activities teaching them about a wide range of careers in different engineering sectors
07/10/2011	Yr7 WGSB	Lego Challenge - Half of year 7 took part in a Lego challenge set by the MEBP
11/10/2011	WGSB Staff	Primary Outreach - WGSB staff supported Bronte schools students taking part in the Primary Engineer Challenge, this was a weekly session for three months
01/11/2012	Yr7 WGSB	STEM Club - The new weekly STEM Club was launched with 20 year 7 students applying to take part.
04/11/2011	Yr7 WGSB	Lego Challenge Finals - The winning team from the Lego Challenge went to the Regional finals for the competition
08/11/2011	Sixth Form WGSB	Senior Maths Challenge - A national challenge that we take part in on an annual basis
15/10/2011	Yr13 WGSB	Whitecode - A student visit focussed on engineering and the environment
18/11/2011		DT Exhibition - WGSB was invited to give a presentation about the Primary Engineer Challenges to visiting DT teachers and STEM co-ordinators
27/11/2011	Yr7 WGSB	www.FutureMorph.org - During this week all of yr7 had the opportunity to visit the FutureMorph website and learn about STEM careers
06/12/2011	Yr12 WGSB	Kennards - A student visit focussed on the role of the engineer
09/12/2011	Yr11 WGSB	ICE - Representatives from the Institute of Civil Engineers (ICE) visited and ran an activity raising awareness of careers in civil engineering
05/01/2012	Yr11 WGSB	Arkwright Event - Students attended an event at Greenwich university to raise awareness of the Arkwright scholarship and different types of engineering careers
06/01/2011	Mixed WGSB Knockhall Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the doorhanger project
10/01/2012	Our Lady of the Rosary	Primary Outreach - WGSB staff attended a problem solving session for students taking part in the primary engineer challenge
13/01/2012	Mixed WGSB Dartford Bridge Community Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC K'nex Car project
19/01/2012	Diploma Students	Honda Visit - Year 11 diploma students visited Honda to see their high precision, state of the art manufacturing systems - no photos allowed
20/01/2012	Mixed WGSB Knockhall Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the doorhanger project
24/01/2012	F1 teams WGSB	Greenwich University - F1 teams used the rapid prototyping facilities to produce the wings for their cars and then used the wind tunnel to test their aerodynamics
26/01/2012	Mixed WGSB Primary school	Primary Outreach - students and staff from WGSB ran science activities and discussed science careers with primary students
26/01/2012	Mixed WGSB	BSKC practice sessions - 10 Karting teams from WGSB attended the British Schools Karting Championship practice sessions in preparation for the local finals
27/01/2012	Mixed WGSB DBCPS	Primary Outreach - 3 students from WGSB assisted Primary school students with the doorhanger project
01/02/2012	Yr11 WGSB	Arkwright Aptitude Test - Students who apply for the Arkwright scholarship are required to sit a rigorous aptitude test
01/02/2012	Mixed WGSB	BSKC local finals - 10 Karting teams from WGSB attended the British Schools Karting Championship local finals, three teams making it through to the regionals finals
02/02/2012	Yr9-11 WGSB	Intermediate Maths Challenge - A national challenge that we take part in on an annual basis

Date	Students Involved	Activity
03/02/2012	Mixed Primary schools	Primary Engineer Regional Finals - Students from Primary Schools across the South East attended the regional finals for the challenge at WGSB
04/02/2012	Yr12 WGSB	Disneyland - 4 Students from WGSB visited Disneyland Paris to learn about a range of
08/02/2012	FI teams WGSB	FI in Schools Regional Finals - 3 teams from WGSB were very successful at the FI regional finals held at London City University
24/02/2012	Visiting DT teachers	Primary Engineer Training Event - Staff at WGSB ran a training event for staff from local primary and secondary schools who have joined Primary Engineer
28/02/2012	Whole school and visitors	Bloodhound SSC Education Centre Launch Event - over 500 people including business people, visiting primary and secondary students, WGSB students and parents attended the launch event and learnt about the Bloodhound SSC project and had the opportunity to see the full size model of the car
01/03/2012	Yr7 WGSB	Natural History Museum - Year 7 visited the Natural science Museum in London
02/03/2012	Mixed WGSB DBCPS	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC Balloon Car project
03/03/2012	Mixed WGSB	BSKC Regional Finals - The 3 winning teams from the local finals took part in the regional finals with one team taking fourth place and a slot in the National finals
09/03/2012	Mixed WGSB Bronte School	Primary Outreach - 3 students from WGSB assisted Primary school students with the doorhanger and Bloodhound SSC Balloon Car projects
13/03/2012	Yr7-9 WGSB	National Science and Engineering Week - Key stage 3 DT project homeworks were based on the NSEW challenge
23/03/2012	Mixed WGSB Bronte School	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC K'nex Car project
23/03/2012	Yr7 WGSB	Lego Challenge - A group of Year 7 students attended a Lego control activity at Newstead Wood Girls School
27/03/2012	Mixed WGSB	Caterham Visit - Students from the team building the Caterham car visited the Caterham Factory
30/03/2012	Mixed WGSB	Caterham Visit - Students from the team building the Caterham car visited the Caterham Factory
26/04/2012	Yr7-8 WGSB	Junior Maths Challenge - A national challenge that we take part in on an annual basis
27/04/2012	Mixed WGSB Horton Kirby Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC K'nex Car project
27/04/2012	Yr9 WGSB	Go4SET - A team of year 9 students attended the launch of the Go4SET challenge at Littlebrook Power Station, this was the start of a 6 week challenge
04/05/2012	Mixed WGSB Horton Kirby Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC Balloon Car project
12/05/2012	Mixed WGSB Members of the public	Trevithick's Industrial Dartford - A free event held in Dartford Central Park, WGSB staff and students ran projects in the schools marquee including Bloodhound SSC activities
25/05/2012	Mixed WGSB Horton Kirby Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC K'nex Car project
01/06/2012	Mixed WGSB Maypole Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC Balloon Car project
15/06/2012	Mixed WGSB Maypole Primary	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC K'nex Car project
29/06/2012	Joyden's Wood Students	Primary activity at WGSB - Students from Joyden's Wood Primary school came in to manufacture miniature picture frames on the laser cutter
05/07/2012	Mixed WGSB	STEM Leaders Award Interview - Steve Smith from Delphi pumps came in to be interviewed by a panel of students applying for the STEM leadership award
06/07/2012	Mixed WGSB Bedonwell Junior	Primary Outreach - 3 students from WGSB assisted Primary school students with the Bloodhound SSC K'nex Car project
09/07/2012	Mixed WGSB	Enrichment Week - Two Bloodhound SSC projects ran in school with KS3 students
16/07/2012	Mixed WGSB	Go4SET Finals - Students presented their work on energy efficiency measures for the Evans building to a panel of experts from Littlebrook Power Station
19/07/2012	Yr8 WGSB	Intertek - A team of ambassadors worked with year 8 looking at a range of science and engineering careers

INTERESTED?

Looking for something to do during the holidays?

Why not try looking at You Tube, there are loads of videos of how to do simple science experiments at home including alkaseltzer rockets, making slime, making glowing water, soda balloons. The possibilities are endless and they look really good fun. Most of them make a huge mess and it would be best if they can be done outside. Video or photograph your experiments and put them on <http://wgsbengineeringfocus.weebly.com/>

Websites

Here are a few websites with games and challenges that you might find interesting

- <http://www.nuffieldfoundation.org/stem/nuffield-stem-games>
- <http://www.stemchallenge.org/>
- <http://www.futuremorph.org/>
- <http://www.wemadeituk.co.uk/>
- <http://faraday.theiet.org/>
- <http://www.sciencemuseum.org.uk/onlinestuff.aspx>
- <http://www.weebly.com>

<http://wgsbengineeringfocus.weebly.com/> our schools engineering website, we'd love to know what you have been up to so share your trips, games and experiments with us by uploading photos and stuff to our forum.

You could visit—

Locally

The Science Museum, London

<http://www.sciencemuseum.org.uk/>

RAF Hendon

<http://www.rafmuseum.org.uk/>

The Victoria and Albert Museum

<http://www.vam.ac.uk/>

The Natural History Museum

<http://www.nhm.ac.uk/>

Trying to avoid the Olympics? How about -

The Coventry Transport Museum

<http://www.transport-museum.com/>

I can thoroughly recommend it, particularly if you want to find out more about Thrust2 and Thrust SSC

Beaulieu National Motor Museum, the New Forest

<http://www.beaulieu.co.uk/>

To see older land speed record vehicles, a great place to visit, although a little expensive.

The National Space Centre, Leicester

<http://www.spacecentre.co.uk/>

Museum of Science and Industry, Manchester

<http://www.mosi.org.uk/>

Brooklands and Mercedes World, Surrey

<http://www.brooklandsmuseum.com/>



Institution of MECHANICAL ENGINEERS Leaders Award for STEM
create a ripple... www.leadersaward.com

2012 Engineering Photo Competition

"Mechanical Engineering: It's not what you think."

What is mechanical engineering?
Take a photograph of something you think represents what mechanical engineering is.

Mechanical Engineering is involved in all sorts of things around us, from smart phones to aeroplanes, food packaging to artificial limbs.

Who can enter?
This competition is open to all our members, young members and school students aged 5-18 years.

Describe your photo in 100 words explaining why you have submitted this picture, what does it say about the world of engineering around you and why you chose to submit it.

Winning photographs will be displayed at the prestigious IMechE headquarters in London.

How to enter?
Take a photo and submit to the editor@leadersaward.com along with your explanation by the 24th September 2012.

Primary Engineer Programmes
...the first step



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