

## Flying High with K'Nex



Thomas and Elliott's winning model which transformed from a fixed wing aeroplane to a helicopter

Elliot Sheppard (11) and Thomas Dowden (11) from Bressingham Primary School in Diss, Norfolk have become the 2008 K'Nex Challenge champions after winning the English National Final at the Imperial War Museum, Duxford. Sixteen teams reached the final out of over 50,000 teams from across England who entered the competition.

In a two hour time frame, using only the K'Nex construction kit provided, Elliot and Thomas had to design, build and demonstrate a model flying machine capable of carrying three packages of cargo. Their model was a twin propellor powered aircraft, which featured a swing wing design to enable vertical take-off. The undercarriage even had a novel suspension to cushion landing. The boys' design was up against several different solutions, including fixed wing, helicopter and hybrid designs.

*Elliot said, "Although we didn't know until the challenge began what we would have to build, we guessed it would be aviation-based because of the venue. I had been inspired by the American 'Osprey' aircraft, which takes off vertically and by large transport planes having looked at my dad's aeroplane magazines."*



Duxford's Imperial War Museum's aviation collection provided plenty of inspiration

*Tom said, "I was inspired by the tailplane on the American 'Tom Cat' fighter aircraft I saw earlier in the museum whilst on our tour".*

Working together as a team the boys designed their model to incorporate the features they most admired in their favourite aircraft and succeeded in making a finished machine that was sturdy and well up to the task of transporting the three packages, which weighed about the same as a bag of sugar. All the parts including propellers, undercarriage and wings worked perfectly.

In addition to spectacular K'Nex construction kits, the boys each won £100 plus £750 for their school and a beautiful crystal trophy.

We would like to thank Hasbro for sponsoring the K'Nex Challenge, and the Imperial War Museum for hosting the final at Duxford, a venue which both inspired and excited the finalists.

Each year the K'Nex Challenge provides primary school children with an introduction to the exciting world of design and engineering. It challenges them to produce a specific design solution for a problem posed, and then build it using K'Nex. The challenge runs throughout the year with young engineers progressing through four levels - School, County/Area, Regional and National.

### Congratulations also go to:

#### Winners of the Scottish National Final

Robin Perrie & Kyle Gray of Heathery Knowe Primary School, East Kilbride

#### Winners of the Welsh National Final

Arif Ahmed & Ahmed Ali of Mount Stuart Primary School, Cardiff

## Racing Baggage Buggies

Anyone who has been to an airport will have seen a variety of vehicles with trailers moving baggage from the aircraft to the terminal and vice versa. These vehicles form a key part of the luggage and freight handling system in an airport and speed and safety of delivery are key factors in keeping travellers happy.

BAA is therefore keen to ensure that these vehicles are right for the job and invite Young Engineers club members to come up with a design for a new Baggage Buggy that will speed up the transit of luggage. If you make it to the finals you'll get a chance to put your buggy through its paces on a test track/runway.

### The Challenge

Your task is to design and make an environmentally friendly and eco powered model Racing Baggage Buggy capable of towing baggage carts loaded with luggage down a set race track in a straight line. The buggy must race down the track as quickly and as efficiently as possible with its cargo of luggage!

### Entry Requirements

The challenge is free to enter and is open to all registered Young Engineers Clubs and UK schools. Students may work in teams of up to 4 members from within the same age category. Clubs may enter more than one team. Think of a name for your team and register with Young Engineers online at: [www.youngeng.org](http://www.youngeng.org). Once registered you will be supplied with: Full challenge criteria; Information on how to prepare a design portfolio; and Buggy advice sheet (suggested components or kits etc)

### Phase one:

Prepare an eight page design solution portfolio and send to Young Engineers.

### Phase two:

A selection panel will assess the design portfolios and choose entries to attend the national final.

### Phase three:

Teams attending the national final must build their Racing Baggage Buggy and ensure it is in race condition. All buggies compete in races within their own age category, with winning teams progressing to the next round of races. Teams must make a short presentation about their buggy to a panel of judges.

### Age Categories

Group 3	age 7-11	(KS2 or equivalent)
Group 2	age 11-14	(KS3 or equivalent)
Group 1	age 14-19	(KS4/5 or equivalent)

### Prizes

The following prizes will be awarded to the winners of each age category.

- Best Presentation
- Best Design & Construction
- Overall Winner (Fastest Race and Baggage Retention)

### Key Dates

20 Feb	Entry Closing Date
27 Feb	Design Submission Date
13 Mar	Selection Panel and Phase 2 results
July	(TBC) National Final



The poster features the Young Engineers logo at the top right and the BAA logo at the top left. The main title is 'BAA Challenge Racing Baggage Buggies'. Below the title is the BAA Communities Trust logo. The central image shows a white baggage buggy on a runway with a Young Engineers logo on the tail of an aircraft in the background. Text on the right side of the poster includes: 'Ever seen those little baggage carts that transport luggage with your precious holiday items from the terminal to the aircraft ready to be loaded into the cargo bay?', 'Ever wondered how fast they can go?', 'Ever wondered what it would be like to race them?', 'Then this challenge is for you!', 'BAA and Young Engineers invite teams of students to design and make an environmentally friendly, eco powered model Racing Baggage Buggy!', 'This is your chance to drag race your model and ensure it keeps its luggage load as it streaks down the track!', 'Clubs registering for the first time and who are selected for the National final are eligible for a Buggy Assistance Grant.', 'The challenge is open to students aged from 7-19 in full time UK education!', and contact information for Young Engineers.

## Heathrow hosts BAA's Plane Park and Ride Challenge

Our young engineers certainly impressed the BAA's judges at the recent national final of the BAA Plane Park and Ride Challenge, held at The Academy, Heathrow Airport.

The challenge tasked teams of students to design a new plane park and ride system. The system needed a vehicle capable of automatically navigating and transporting a plane safely through the miles of taxi ways to the parking stand and ensuring it could avoid the many other aircraft and all manner of service vehicles that criss-cross their path. The finalists came up with a range of interesting and innovative solutions including line followers and water powered vehicles.

The students were also given the unique opportunity to have a guided tour of T5, to meet BAA engineers and to see a Thermal Imaging camera in action. Students also had their infra red images captured on film and were able to take these home as a souvenir of the event!

### RESULTS

**Winner** Gruesome Girls, Emerson Park School, Hornchurch

**Runner Up** Out of the Blue, Grangefield Technology School, Stockton-On-Tees

**Thermal Imaging Competition** Sky High, St Bede's Catholic Comprehensive School, Peterlee

## Egg Chasm Crossing

Your task is to design and build a system that will allow a raw hen's egg to cross a 'bottomless' chasm without damaging the egg. The egg must be **picked up** on one side of the chasm and **deposited safely** on the other side of the chasm. You are not allowed to touch the egg at any time during the pick-up/crossing/set down. How the egg crosses the chasm is left to the creativity, imagination and discretion of the individual teams but the solution **MUST** have a physical structure and not be simply a catapult or rocket based solution. The egg cannot fly or be flown. The minimum width of the chasm is 1.5m.

Possible solutions might include: bridges, cranes, cantilever arms and swings. But research, imagination and the creative use of the allowed materials will invariably yield other effective solutions.

### Egg Crew

Project Eggs Factor is free to enter and is open to all UK school students age 7 to 19. Students may work as individuals or in teams of up to 4 members. Family or friend groups may include one adult as part of a team. Young Engineers Clubs, schools or other youth groups may only enter students. There is no limit as to how many students or teams a school or group may enter. Teams must consist of students within their own age category.

Think of a name for your team and register your Egg Crew with Young Engineers online at: [www.youngeng.org](http://www.youngeng.org).

Once registered you will be supplied with:

- Official list of approved crossing materials
- Full chasm criteria and dimensions
- Point scoring system and prize details.

### Age Categories

Group 3	age 7-11	(KS2 or equivalent)
Group 2	age 12-14	(KS3 or equivalent)
Group 1	age 15-19	(KS4/5 or equivalent)

### Initial Chasm Criteria

- There is no limit upon the number of team or individual entries.
- The chasm is deemed to be bottomless; the egg must not touch the 'floor of the chasm' nor may any part of your egg transport system.
- Your solution must meet the criteria specified for your age group.
- Only products shown in the 'List of Approved Materials' may be used.
- All journeys must be verified by an independent adjudicator.
- All teams must agree to be honest in their endeavours.
- To qualify for awards and a place on the Egg Crossing Board, teams must provide video footage of their crossing to Young Engineers.
- Entries that meet the full Chasm Criteria (available upon registration) will be eligible for end of term and end of year awards.
- An Egg Crossing Leader Board on the Young Engineers website will record results and video footage.

### Point Scoring & Prizes

A judging panel will review and award points to each entry, a total score will be posted on the Egg Leader Board along with supporting video footage. At the end of the year, the six highest scoring entries in each age category will be reassessed to determine their final end of year score.

There will be prizes for the highest scoring entry for each age category at the end of each term and an end of year overall winner.

### Egg Timetable

Term closing dates for video footage:

Term 1	19th December
Term 2	18th April

NB: Special National Science and Engineering Week Entries - All of March

Term 3 20th July

All end of term dates will finish at 17.00 UK time. All entries received after the end closing date will be carried forward to the next term and be added to the Egg Leader Board!

The poster features the Young Engineers logo at the top right. The title 'Project Eggs Factor Egg Chasm Crossing' is prominently displayed. An illustration of a brown egg wearing blue goggles and a blue hand is shown. The Airbus logo is in the top left. Text prompts include: 'Think about an egg...', 'Think about a chasm...', 'Think about how the two go together???' and 'Think Eggstastic!'. It lists 'New Rules!', 'New Criteria!', 'New Challenge!', and 'New Rewards!'. A central question asks: 'Can you rise to the height of the challenge by designing and building a method of transport capable of moving a chicken before it has its own wings?'. It also states: 'Airbus and Young Engineers challenge you to test every part of your engineering capabilities by getting a chicken egg across a chasm!' and 'We don't want an eggsploit we want an eggosplimentary crossing!'. A note says: 'The challenge is open to students aged 7-19 years old and is free to enter!'. A diagram shows a chasm with a bridge-like structure and an egg being transported. Contact information is provided in a black box: 'Contact: Young Engineers for further details or complete the registration form overleaf. Tel: 01428 727265 Email: projects@youngeng.org Web: www.youngeng.org'. The website 'www.youngeng.org' is at the bottom.

## 2008 Project Eggs Factor Results

Rocket 3 in Downbrook Middle School got the furthest distance in the 2008 Project Eggs Factor flying challenge with an incredible 123m flight. Project Eggs Factor challenged schools and families to fly a raw egg the furthest distance. Although this year's Project Eggs Factor prizes will go to those taking part in the new Egg Chasm Crossing, we will still be charting the progress and posting videos of groups still wanting to take part in the flying challenge just for fun! And with the rules relaxed, teams are free to get really creative...

### Overall 2008 winners – prize £300 & goody bags

KS2	Staniland Primary School with a 123.0m flight by Rocket 3
KS3	Downbrook Middle School with a 123.0m flight by Rocket 3
KS4+	St Andrew's CE High School for Boys with a 90.6m flight by Joe's Rocket

### Flight Endeavour Awards – prize £200 & goody bags

Dulwich College Prep School and Holy Trinity School

*In addition all flights shown on our leader boards qualified students for goodies. All teams received Eggs Factor Flight Certificates.*

Can you devise and build a remote control vessel to assist the crew and passengers of The Star Gazer? Can you repair its hull and engines? Can you guide The Star Gazer through the minefield?

**The Mission**

The Star Gazer is floating in a relatively inaccessible lagoon and needs a number of repairs to be made before it is fit for recovery. The tide is falling and in eight hours the ship will be aground causing further damage. Your task is to repair the stricken British liner and devise and build a maritime vessel that will enter the lagoon and safely tow the liner through the minefield into deeper water in the quickest time possible.

Your rescue vessel must be able to cut the tether lines of the mines and carefully move them to a safe area in order for the liner to be towed to safety. Your remote control vessel must not exceed 40cm x 20cm including your cutting mechanism. All mines are tethered and measure 5cm diameter and float 3cm below the surface.

You may not use commercial systems or a pre-formed commercial hull.

**Mission Conditions**

Operation Clean Sweep is free to enter and is open to all registered Young Engineers Clubs and all UK schools. Students aged 12-19 years old may work in teams of up to 4 members from within the same age category. There is no limit upon how many teams a club or school may enter.

Think of a name for your team and register with Young Engineers online at: [www.youngeng.org](http://www.youngeng.org).

Once registered you will be supplied with:

- Full challenge criteria
- Information on how to prepare a design portfolio
- Vessel advice sheet (suggested components or kits etc)

**Phase one:**

Prepare an eight page design solution portfolio and send to Young Engineers.

**Phase two:**

A selection panel of Royal Navy engineers will assess the design portfolios and choose entries to attend the national final.

**Phase three:**

Teams attending the national final must build their rescue vessel and ensure it is in working condition. All teams will be required to give a short formal presentation to a panel of Royal Navy judges on their vessel and the design process. Team members will also be required to perform a series of engineering tasks to 'repair' the stricken liner systems.

**Age Categories**

- Group 2 age 12-14 (KS3 or equivalent)
- Group 1 age 14-19 (KS4/5 or equivalent)

**Mission Rewards**

The following prizes will be awarded to the winners of each age category.

- **Titanic Award for** (Perseverance in the Face of Overwhelming Odds)
- **Best Mission Team Costume**
- **Best Presentation**
- **Best Design & Construction**
- **Overall Winner** (highest score for mission completion)

**Mission Timeline**

- 14 February Entry Closing Date
- 20 February Design Submission Date
- 27 February Selection Panel and Notification of Results
- June/July (TBC) National Final - Mission Completion

**Royal Navy Challenge**  
**Operation Clean Sweep**

**Young Engineers**

**ROYAL NAVY**

**Young Engineers needs YOU!**  
**The Royal Navy needs YOU!**

So grab your initiative, jack your project skills, include your creativity and prepare to engineer a solution to:

**Operation Clean Sweep.....**

Far away lies a stricken cruise liner, The Star Gazer. An accident in the engine room caused damage to the hull and to the main engine. The ship has managed to limp into a lagoon during the spring high tide. Now that the tide is falling, the crew of The Star Gazer can see how lucky they were.

Outside the lagoon is an old and uncharted minefield. A minefield they cannot possibly hope to negotiate on their own. They need you to assist them with their repairs and build a remote controlled vessel to safely tow them through the dangerous minefield to the safety of deep waters of the ocean.

Clubs registering for the first time and who are selected for the National Final are eligible for a Vessel Assistance Grant.

The Challenge is open to students aged 12-19 years old and is free to enter.

Contact:  
Young Engineers for further details or complete the registration form overhead.  
Tel: 01428 727265  
Email: [projects@youngeng.org](mailto:projects@youngeng.org)  
Web: [www.youngeng.org](http://www.youngeng.org)

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Wherever you look, engineering has a major role to play; whether it is in providing the power and music for your MP3 player, designing a new water filtration system, preventing flooding or even making the machines that produce clothes. However, you rarely get the opportunity to see engineering in action, to marvel at the ingenuity and complexity of modern engineering systems or to meet the people involved with this work.

The Lloyd's Register Educational Trust offers such an opportunity and every year six students (aged 16-19) are selected to take part in a fantastic 3-4 day all expenses paid Engineering Experience. In previous years groups have visited: Greece, Croatia, Holland and Belgium and the 2008 students visited New York!

The LRETEE usually takes place around the October half term holiday. Your entry will enable you to be considered for next year's trip but you must be aged 16-19 and in full time education at the time of the trip.

You could be one of the select few invited to enjoy such an experience but first you will need to convince us that you have a passion for engineering and that you will gain benefit from the trip.

Remember you are likely to need a passport!

Go to [www.youngeng.org](http://www.youngeng.org) for further details and to apply.

**Closing date: 30th May**

**Lloyd's Register Educational Trust**  
Engineering Experience

**Young Engineers**

Have you an interest in Engineering or Technology?  
Are you 16-19 years old?  
Are you in full time UK education?

**Then this is an opportunity you cannot miss!**

The Lloyd's Register Educational Trust and Young Engineers are looking for students to self-nominate for a once in a life time opportunity...

An all expenses paid trip to a fantastic destination to see real engineering and technology in action

Six lucky students from across the UK will be selected to attend a unique 3-4 days Engineering Experience where they will be able to gain new insight into the world of engineering and technology.

**Where will you go?**  
New York?  
Amsterdam?  
Paris?  
Trieste?  
Athens?

The possibilities are endless, enter today and find out if you've got what it takes to be one of the lucky few!

Contact:  
Young Engineers for further details or complete the registration form overleaf.  
Tel: 01428 727265  
Email: [projects@youngeng.org](mailto:projects@youngeng.org)  
Web: [www.youngeng.org](http://www.youngeng.org)

**Lloyd's Register Educational Trust**

[www.youngeng.org](http://www.youngeng.org)

## Get Them Going! Our Activity Bank Continues to Grow



Hover Brush Monster Activity

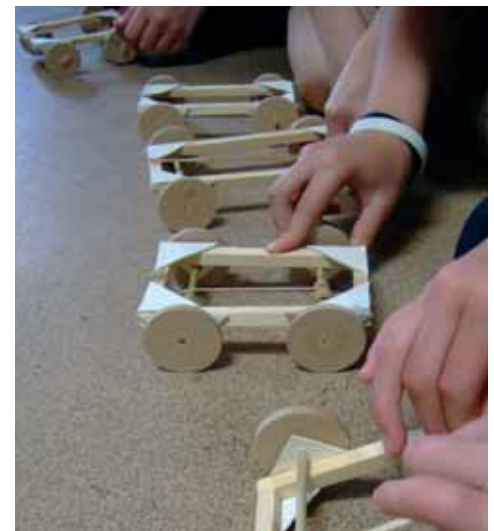
Remember that as well as running exciting challenges and competitions, we have starter programmes and an Activity Bank full of ideas for club sessions and longer projects. This term we are adding the following activities for ages 7 to 14:

**Chip Box Hovercraft, Bath Bombs, FM Radios, Water Purification, Putt Putt Boats, Cranes, Potato Clocks and Simple Robots!**

Club Leaders working with new groups aged 11 to 14 with funding at their disposal can also order our Get Them Going Resource Pack (£340 incl p&p), so they can save preparation time and keep their energy for the club sessions!

**Have you got a good idea for the Activity Bank?**

Help spread good practice and get wider recognition for your ideas. Contact [clubs@youngeng.org](mailto:clubs@youngeng.org)



Elastic Band Buggies Activity

Today, it is true to say that virtually every aspect of our daily lives is enabled or aided in some way by engineers. Engineers make things happen, they turn ideas into products and they provide the practical solutions to life's everyday problems.

What makes engineering so exciting is that you can apply it to all of the things that interest you most – these might include healthcare, the environment, sport and leisure, transport, entertainment, information technology or anything you care to name – because they all rely on engineers to a lesser or greater extent.

If you are creative, innovative and enterprising – then you have the potential to be an engineer and to help change the world for the better.

So why not enter the Young Engineer for Britain competition now and take a giant step towards achieving a fulfilling future. The competition is free to enter.

**Who Can Enter**

Students aged from 12 to 19, who attend schools or colleges in the United Kingdom, are eligible. Entries are accepted from individuals or teams of up to four and the age of the oldest member will determine the age group in which the team is judged. Closing date for entries is 31 May.

**Age Categories**

- Group 2 age 12-16
- Group 1 age 16-19

**Judging**

All projects demonstrated at the Regional and National Finals will be scrutinised by experienced judges. The judging criteria will award points to each of the award categories; all projects will be judged for 'design and innovation' and 'product development and marketability', each project will then be judged in one of the remaining two categories, dependant upon which category best suits the project. The scores for each category are then added together giving all competitors no matter what engineering discipline an equal opportunity to become Young Engineer for Britain.

**Award Categories**

- Design, Innovation and Presentation
- Product Development and Marketability
- Integration and Application of Electronics
- Manufacture and Finish

Prizes will be awarded to the winner in each award category and age group at both Regional and National Finals.

A series of Regional Finals will be held around the UK in June and July.

Overall Regional Winners receive £250 and qualify automatically for the National Final. Here, you could win a substantial cash prize, become Young Engineer for Britain and win a trip to America to represent Britain in the next International Science and Engineering Fair (ISEF). In addition selected other projects of merit will be chosen to attend the National Final. All prize money is shared between the competitors and their school.

At the National Final, several Awards of Merit are given to projects where judges believe a student deserves additional recognition for a particular aspect of the project. The Awards of Merit are not rigid and are selected totally at the judges discretion.

Check out our website for full entry conditions and guidance on how to display and present your project. [www.youngeng.org](http://www.youngeng.org)



Last year's Young Engineer for Britain Winner Patrick Burns with his Automatic Hazard System

# Rapid Relay gets clubs working together at Club Showcases

The Rapid Relay engineering challenge provided a brilliant ice breaker at this year's Club Showcases.

The Club Showcases offer Young Engineers Club Network members the opportunity to celebrate their achievements at local events, where they can get together, display their work, make friends and exchange ideas. The attending clubs were represented at the event by a team of four students and prepared a display for the event, showing photos of the club in action, projects created and so on.

*"Visiting other stands to see their design ideas, was an eye opener for our pupils"*  
**Natalie Sutton, Bournville School & Sixth Form Centre (Midlands Showcase)**



*"They really did enjoy this part, some of the group are usually very reserved in school but participated in this part very well. The Young Engineers staff always take time to talk to the children and show interest in their projects."*  
**Carolyn Bryan, Uplands Junior (Midlands Showcase)**

Each year, Young Engineers devises an 'on the spot' engineering challenge, giving the club representatives the chance to show off their engineering talent and ingenuity.

This year's challenge, the Rapid Relay, got clubs working together as they each took responsibility for building a series of different mechanisms to transport a wooden ball through a sequence of checkpoints before firing it through a hoop.

*"We especially liked the less competitive feel to the event due to the well thought out plan – clubs taking different challenges but helping each other to complete the task... True engineering."*  
**Neil Waters, Allendale Middle School (Northern Showcase)**



In the Rapid Relay challenge, clubs each took responsibility for building sections of a machine which transported an object through a sequence of checkpoints before firing it through a hoop.

The challenge winners were selected not only on the basis of smooth delivery of the ball to the next checkpoint, but on the sophistication of their design, their teamwork and communication skills, and their economy in use of materials. There were prizes for both the best primary and secondary participants. Secondary school young engineers won ingenious Voice Changer kits, while primary school young engineers won either K'Nex Levers and Pulleys kits or Snap Circuit Rovers, which are remote control rovers that can be assembled without tools or soldering.

*The challenge prize was very good for inexperienced youngsters- Just the job for us."*  
**Sarah Smith, Church Crookham (SE Showcase)**

Although there was some element of competition, as clubs helped to decide who should be awarded the title of 'Best Club' in their region, the Club Showcase is primarily a celebration of achievement where everyone's efforts are recognised.



As well as supplying the physical resources needed to run the Rapid Relay and prizes for the challenge winners, Rapid very kindly supplied £50 vouchers to each club at each of the showcases. With their ever expanding range of supplies for both Primary and Secondary schools, everyone was thrilled with the vouchers.

This year's Club Showcases confirmed our belief that everyone benefits from mixing with different kinds of clubs - large and small, primary and secondary, new and established. The showcases often take place alongside the Young Engineer for Britain and K'Nex Challenge regional finals, and other local competitions, giving schools the opportunity to get involved with several competitions on one day. So why not get your school involved next year?

The Club Showcases take place towards the end of the Summer term, and are a great high point on which to end the club's activities for the year. Expressing interest at this point helps us to plan the Showcases to match demand, and will remind you to start saving bits and pieces as a record of your achievements – a rewarding process in itself!

To find out more and register go to competitions on [www.youngeng.org](http://www.youngeng.org). You can also see photos of this year's Club Showcases, and watch video of the Rapid Relay.

# Oliver Goldsmith's Primary Club Story

Oliver Goldsmith Primary School has been involved with Young Engineers and the London Engineering Project (LEP) since its inception two years ago and as a result now has a 36-strong after school Science and Engineering Club for Year 6 students. Led by the school's Science Coordinator, Hedney Gordon, every Thursday afternoon the children work in groups to solve the problems set for them. However they are under no pressure to record anything on paper, making it both a fun and a worthwhile learning experience.

Hedney has shared the club's activities with the whole school through running their own Science and Engineering Week. The older pupils demonstrated what they had been doing on Club days, and the younger pupils were encouraged to have a go at some of the activities, which has built up their confidence and forged mentoring relationships between the older and younger students. Many of the younger pupils are already expressing an interest in joining the Club when they are old enough.

As well as doing the engineering activities from the Young Engineers Get Them Going Activity Programme, they entered the K'Nex challenge last year and had two of their students reach the London Regional Final last July.



Club members experimenting with Balloon Rockets from the Get Them Going Activity Programme available to Club Network members on [youngeng.org](http://youngeng.org)

As a result, of being involved with Young Engineers and the LEP and the hands-on activities it offers, the school has been able to improve its delivery of investigative and practical science; areas where it felt it could improve.

*"I have found running the club really beneficial for honing my own skills as Science Coordinator. We have 36 children coming to the after-school club, and even some of the Year 7s who attended last year's club are coming back to help out. The club has been so popular that I would like to introduce activities for Years 4 and 5 too"*

**Hedney Gordon Club Leader at Olive Goldsmith Primary School.**



## Be part of the New Young Scientists & Engineers Fair

This will be held at the QEII Conference Centre in London, 4th – 6th March 2009, the Fair celebrates and raises the profile of young people's innovation and achievement in science and engineering. The Fair will have three main elements: a substantial range of exciting STEM activities including presentations,

workshops and master-classes; an industry exhibition area; and a STEM showcase of students' achievements. Young Engineers is already heavily involved in the student showcase: it will include our Young Engineer for Britain finalists and National Young Engineers Club Awards, as well as CREST Awards

and self-nominations for the new National Science Competition. Schools will be able to bid for places so watch out for more details on the News and Events section of [www.youngeng.org](http://www.youngeng.org)

### Enter the National Science Competition

Britain's most outstanding young science and engineering talent will soon be able to battle it out for one of two new national awards in an exciting new competition.

The National Science Competition is seeking the UK Young Scientist of the Year and the UK Young Technologist of the Year. Each winner will receive an array of substantial prizes including a large cash prize and chances to represent the UK at international science conferences and fairs or other once-in-a-lifetime opportunities. The award in technology will be given for achievements focused on design and production in the fields of technology and engineering. Young Engineer for Britain National Finalists will automatically be entered for this award in recognition of their engineering achievements. Further information about the National Science Competition (including how to enter) can be found at [www.nationalsciencecompetition.org](http://www.nationalsciencecompetition.org).

# Get Your Club Out and About

Getting club members into the community and making the connection between engineering and its impact on our lives is a hugely worthwhile venture. As a junior club, North Nibley Young Engineers stuck to local industry, but still found they could relate what they saw on the visit to their club projects and school work. Older club members working on longer projects or challenges often find visiting a relevant manufacturer or location can help them to put the problem they are solving into context and, as Grangefield Young Engineers discovered, this can lead to them gaining an important edge in competitions. Some tips on how to go about setting up an industrial visit are available in our **Club Handbook** on [www.youngeng.org](http://www.youngeng.org)

## Grangefield visit Tugmaster to help BAA Challenge research

As part of their research for their entry into last year's BAA Park & Ride Challenge, Grangefield's Young Engineers Club visited Douglas – the Cheltenham-based company that manufactures tugs that are used all over the world.

The students wanted to find out how tugs worked and how easy it would be to modify an existing design in order to fit a more environmentally friendly power source. Their designs called for a fuel cell to replace the traditional diesel engine. When they started the project they didn't know if such a substitution was possible, so they asked the experts at Douglas.

During the visit they followed the process of manufacture and saw the design office to see how the Design Engineers adjusted the designs to meet the needs of each individual customer.

The club members were impressed by the huge assembly area where it takes several



weeks to add the various components to the chassis, which was already manufactured off-site by a sub-contractor. They also learnt about the involvement of a Quality Control Engineer who checks that the tug has been built to the very highest standards before it is sent anywhere around the world. (One was about to be shipped to Dubai when they were visiting).

*"We were delighted with our visit. The people at Douglas showed us some first class facilities, and some amazing pieces of equipment. Being able to follow the production of a tug from the initial design ideas right through to the final quality inspection gave the visit real context and a close look at how a commercial organisation has to operate. Thanks to the expert advice from the staff at Douglas and their support during our research for the BAA Challenge, we secured 2nd place overall in the national competition."*

**Club Leader, Grangefield  
Steve Wilkinson**



Photos from North Nibley's visit to Renishaw and an example of the pivot cards they created afterwards

## North Nibley Junior Gets their Teeth into Renishaw

The club members of North Nibley Young Engineers Club might have thought they had been tricked into going to the dentists instead of on a visit to an engineering company, as the tour started in a dentist's lab!

The presenter caught the Year 3 & 4 pupil's attention immediately with a range of teeth that were handed round for inspection, from the largest to one of the sharpest. They also handled implements for tooth extraction and learnt how they worked to wrench and pull teeth - ouch!! They also looked at teeth and plates made from gold and were surprised by their weight - and value!

Renishaw is an engineering company near North Nibley C of E school in Gloucestershire. Their logo is 'Enabling repeated perfection,' and the company has developed innovative techniques in the science of measuring, which has proved particularly useful in dentistry. Renishaw is able to accurately and precisely copy individual teeth using a probe and a software program to scan each tooth, providing a 3D image which can be used to produce a perfect replica made of zirconia, a hard wearing ceramic.

The club members were interested to learn how the probe moved and how using laser beam technology a millionth of a millimetre. The club members were able to show off their knowledge of decimal places when they were challenged to change the digital read out so that by moving the measure it read zero. This was more difficult than it sounds as the scale read negative numbers too. Renishaw also demonstrated the drilling, cutting and filing process; all operated by computer control in a sealed unit.

Back at school, the group discussed how pivots and levers helped the machines they saw to achieve such fine movement allowing the probes to swivel effortlessly over a surface to map it. They also thought of other ordinary everyday examples to look at, from a door, to a pair of scissors. Once you know what to look for, they're everywhere! The group then made swinging or oscillating movements out of card and paper fasteners.

Thanks to Education Officer Simone Watts, and everybody at Renishaw for making the club so welcome.

## Further afield...

2008 saw not only secondary school students jetting abroad to take part in international competitions. This year primary students also got to go and fly the flag for British young engineers.

Trimley St Martin competed at the international competition final of the First Lego League in April. The team, aged between nine and eleven, from Suffolk, were a little daunted at the prospect of travelling all the way to Atlanta, Georgia in the USA, but also very excited and determined to do their best. They certainly did this when they achieved the maximum possible score on their final run of the course which involved programming a robot, built in part from Lego bricks, to tackle a series of challenges.

The team made the most of their trip abroad by visiting a primary school near Atlanta with which they had been in touch. In front of a large number of enthusiastic counterparts, they presented and demonstrated their work and told them about their home area.

They also enjoyed the sights of Atlanta and the entertainment provided by the organisers. This included being addressed by George Bush senior at the Opening Ceremony and visiting the World of Coca-cola, where they saw a small bottling plant in operation; an interesting display of engineering in its own right.

The team met students from as far a field as Australia, Egypt and South Korea, overcoming language barriers with the universal communication of smiles, handshakes and the exchange of badges and other mementoes.

Derek Edwards, Trimley St Martin's Club Leader, spearheaded a massive campaign prior to the event to raise the funds needed for the trip, but felt his efforts had been well rewarded:

*"The team have had a wonderful time simply being there and participating in a friendly multicultural atmosphere. All of us will remember this experience for many years to come"*



Trimley St Martin Primary School at the International First Lego League Final

**Young Engineer for Britain winners again represented the UK at the International Science and Engineering Fair.**

This year it was the turn of Ruth Amos (18) from Sheffield, whose novel 'Stair-

Steady' device won her the 2006 Young Engineer for Britain title, and Thomas Pitts (19), From Stamford, Lincolnshire, whose 'Profile' automatic bench-top filing machine won him the Craftsmanship and Finish Young Engineer prize in 2007.



Ruth and Thomas at this year's International Science and Engineering Fair in Atlanta

*"I'm so pleased I entered Young Engineer for Britain, it's really opened doors for me, not only helping me to get my project manufactured commercially, but also in providing me with lots of exciting opportunities like representing my country at ISEF. Engineering is so exciting and many young people simply don't understand what it is really about, they are missing out on so much by not getting involved in programmes like Young Engineers."*  
Ruth Amos

## 2008 RS Junior Science Book Prize Winner

Congratulations to the 2008 winner: 'Big Book of Science Things to Make and Do' by Rebecca Gilpin and Leonie Pratt.

The Royal Society Prizes for Science Books aim to encourage the writing, publishing and reading of good and accessible popular science books for adults and young people.

For twenty years, the Prizes have celebrated a wide range of stimulating, engaging, clear and accessible science

books. Each year, the Royal Society invites groups of young people aged 10-14 to become Junior Judging Panels. These panels read the short-listed books and select the final winner. In 2008, thirty-six Young Engineers clubs from all over the country formed judging panels. If you would like to organise a Junior Judging Panel, please visit <http://royalsociety.org/survey/juniorjudgingpanels> to register.

# Toyota Technology Challenge

Registration is now open for the Toyota Technology Challenge 2008-09. Visit [www.rapidonline.com/toyota](http://www.rapidonline.com/toyota) for a registration form and further information.



SOLAR – Toyota Technology Challenge 2007-08 winners - 'Team Phoenix', Hutton Church Of England Grammar School



PIC – Toyota Technology Challenge 2007-08 winners - 'Pimp my PCB', Horndean Technology College

# Mini-light project

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Visit Rapid at the D&T show on stand C42 to see a demonstration

## Join us and take part in Club Member Workshops at D&T Show

This year Young Engineers will be running an interactive stand at the D&T Show where students from our Club Network will take part in short design and make activities. Having students engaged in activity on the stand will give visiting schools the opportunity to learn about the benefits of the Young Engineers Club Network directly from the club members and their accompanying club leaders. The activities will be provided for the students by Rapid, who are one of our long-standing sponsors. The activities will be both suited to curriculum and club activity, and will help to demonstrate to visitors the practical benefits of both our Club Network and Rapid's education kits.

We are looking for club leaders plus 4

to 6 club members to come for half day sessions from Thursday 20th to Saturday 22nd November. We will be able to assist with your transport costs and provide a £50 Rapid voucher (amongst other goodies we'll rustle up) as a thank you for the school's support. To reserve your place, telephone 01428 727265. To help us finalise arrangements, please contact us by 11th October.

Each year Young Engineers is just one of a huge range of service providers and suppliers exhibiting at the D&T show. The show offers D&T teachers: an extensive programme of In-Service Training including Workshops & Seminars; feature displays, demonstrations & hands-on practical areas; a packed programme of exciting pupil project ideas; discussions

of key issues for the delivery of D&T and ICT in specialist schools and what the STEM Agenda means to you.

### Win £1,000 to spend at D+T!

You could find yourself with £1,000 to spend on equipment or resources for your school whilst at the show, plus a case of wine to enjoy with family or colleagues, simply by entering the prize draw. All you need to do is to send an e-mail to [info@ichf.co.uk](mailto:info@ichf.co.uk), putting 'D+T Prize Draw' in the subject box and giving your name, school and e-mail address. The closing date is 31 October. The draw will take place on 3 November and the winner will be notified by e-mail. The money can be spent with any exhibitor at the show.

# New Merchandise



Our merchandise range is designed to help club leaders create a strong club identity, thank your club helpers and reward student attendance and completed projects. We've added 2GB USB sticks and embroidered polo shirts to our

merchandise range. The complete range now includes: pin badges, cloth badges, t-shirts, polo shirts, junior and adult caps, drawstring bags, mugs, umbrellas and tool kits.

Club Network members can also buy: blank certificates, posters to raise awareness of their club, and a Resource Box to accompany the Intermediate Get Them Going! Activity Programme. We now have three Activity Programmes covering ages 7 to 14 which Club Network members can download free of charge.

# Young Engineers Magazine

**3rd Edition on its way!**

Coming to schools in October, this edition of our popular careers magazine for 16-18s has articles on Lewis Hamilton,

Nuclear decommissioning, Blagowrie school at the World Final of the F1 in Schools competition, details of IET Scholarship Awards, and lots more!

# And finally...



Club of the Year Kingston Grammar School made an appearance on Channel 5's Gadget show with their water-rocket powered buggy. It wasn't built for a particular competition – a group of them just wanted to see if it was possible!

Young Engineers would like to thank all contributors to this edition of Fulcrum. We would also like to thank Rapid for supplying the graphic and printing resources for this edition.

Our national sponsors are:



## Join our FREE Club Network

Young Engineers support a network of clubs involved in engineering activities. The network is FREE to join and members have access to:

- **Club Handbook**  
'How to start a Young Engineers Club' is a handbook compiled by experienced club leaders giving advice to new club leaders on topics such as starter activities, seeking outside help and funding.

- **Club Grants**  
Club Grants of £50 are available to active network members.

- **Get Them Going Activity Programmes**  
These courses give Young Engineers club leaders a ready-made programme to introduce new club members to engineering through a series of varied and progressively more complex hands on activities. Beginner (age 7-11) and Intermediate (age 11-14) courses available.

- **Activity Bank**  
The Activity Bank provides our club network with a choice of tried and tested engineering activities, giving them access to ready made ideas for club sessions. In the main, they are written by club leaders for club leaders!

- **National Challenges & Competitions**  
For Club Leaders who want to stretch their members, Young Engineers runs several national club challenges for all ages, and supplies information on many other regional and national engineering competitions.

- **Other Benefits**  
Clubs also receive a range of other benefits such as discounts (including 10% off Rapid's extensive catalogue, newsletter & email updates, an Events Calendar and media coverage through your own club links to our website.

*"Our club has enabled us to develop: more able and engaged students; stronger links with parents and the wider local community; alternative approaches to curriculum areas; and opportunities to promote the school in the press"*  
S Wilkinson,  
Grangefield School

*"The club has been a genuine confidence booster for all concerned, and I would recommend every school in the country has a go at establishing a Young Engineers club"*  
S Clayton-Spencer,  
The Sir John Colfox School

**Join today!**  
To register a club or to find out more about the network and eligibility visit [www.youngeng.org](http://www.youngeng.org) and click Club Network