Employment and Skills Board

Education and Industry

STEM Programme

Projects | North
2016-2017

CONTENTS

INTRODUCTION

The Essex Employment and Skills Board (ESB)'s Education and Industry STEM programme currently works with 30 secondary schools across Essex to develop greater links with local key industry contacts in order to promote the breadth of opportunities open to Essex students.

Through a range of activities we aim to encourage greater take-up of key sector-related qualifications at GCSE, FE and HE levels, and greater numbers of young people progressing into jobs (including Apprenticeships) in the sectors in question. Those activities include industry-led projects, presentations and one-off activities delivered by local companies, and opportunities for young people to gain valuable experience of work.

*Royal Institution (Ri) Science - Engineering Masterclasses*

The key to the success of our programme is effective engagement with companies and individuals with a vested interest in supporting delivery. Through this programme, employers are afforded the opportunity to:

- Identify and work with future talent in local schools
- Raise aspirations of young people and direct them to local opportunities
- Raise awareness amongst young people and their families of specific Apprenticeship routes
- Support communication and the sharing of knowledge between industry and education

We have a menu of planned activities for 2016-17 available to schools across the county. Please find the list of activities and projects, listed by date and by sector focus, on page 6 onwards. We invite your school to be part of them.

CHANGES FOR 2016-17

- Schools need to identify a core group of circa 30 students in years 9 & 10
- Certificates will be given to the students at the end of the two year Programme
- Schools will pick a **minimum** of one project for each term
- We will help support 1-2 enrichment days for years 7-8 to inspire pre-GCSE students to think about STEM subjects
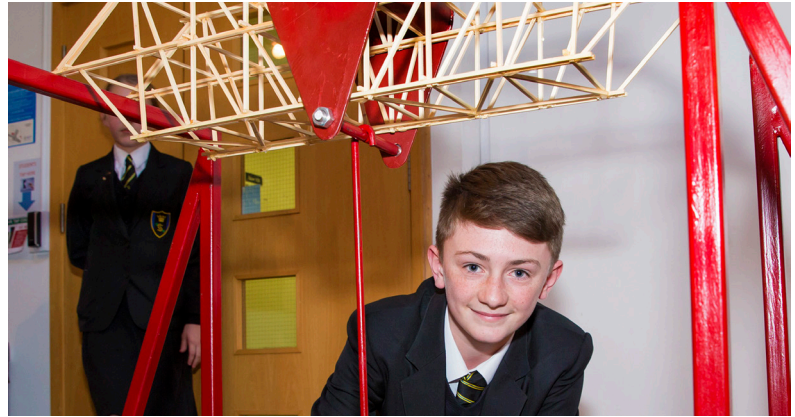
UKAYRoC Build a Rocket Commpetition | AECOM Build a Bridge Competition

CLAIMING FUNDING

We will endeavour to support the best we can on any projects we have listed; if a school wishes to claim any financial help please check with your Skills Manager first before making arrangements.

We have strict procedures regarding the end of the financial year. This means we cannot retrospectively pay for anything after we have submitted our accruals in March 2017. Please be diligent regarding any funding promised – we will send reminders at the end of the year but be aware that without your input your school may miss out.

TRANSPORT

To enable students to attend activities it is envisioned that the schools will use their minibuses. On occasions where this is not viable please contact your Skills Manager.

TERM TIME TABLE 2016-17

| 2016-17	First day of term	Last day of term
Autumn Term	Thursday 1 September 2016	Friday 21 October 2016
Autumn Term	Monday 31 October 2016	Wednesday 21 December 2016
Spring Term	Thursday 5 January 2017	Friday 10 February 2017
Spring Term	Monday 20 February 2017	Friday 31 March 2017
Summer Term	Tuesday 18 April 2017	Friday 26 May 2017
Summer Term	Monday 5 June 2017	Friday 21 July 2017

E&I STEM PROGRAMME CONTACTS

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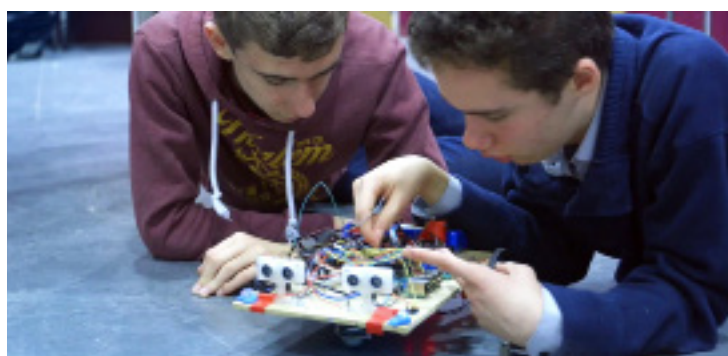
Ri Science Show - Explosive Food Event | Future of Essex EDA winner 2016

Look out for these symbols to give you a guide as to what you can expect from the events below:

Careers Event

Industry Visit

Project

Work Experience

ENRICHMENT DAYS

Royal Institution Science Shows

Target Year Group(s): Years 7-8
Participant Numbers: Up to 450 students and 30 staff members

These shows are jam-packed with experiments, demonstrations and the odd explosion! The shows give students, teachers and families a chance to see the **Royal Institution**'s specially trained presenters in action, delivering science shows to your students in the school setting. The RI's presenters will deliver two or three science shows to students, and a CPD session for teaching staff.

STEM Speed Networking

Target Year Group(s): Years 9-11
Date: Date convenient to the school in question

Schools will be asked to identify students, plus a family member/carer, with a genuine interest in finding out more about careers in STEM. Students will have the opportunity to meet a range of local STEM ambassadors in order to gain a concise insight into STEM careers and opportunities. Students will spend five-six minutes at each table. This will be an opportunity for ambassadors to share details about their own career journey and their day to day work and for the students to ask questions.

Upscience Enrichment Days

Target Year Group(s): All ages
Participant Numbers: Up to 30 students in total
Date: Summer term

Upscience have a catalogue of STEM based workshops and presentations ranging from Rocketry, Aerodynamics, Aviation, Electronics, Microcontrollers, Telemetry, Hydraulics, material sciences, Engineering History, Enterprise and many more. These workshops are suitable for opening events, science and STEM festivals, maker fairs, transition weeks and enterprise weeks.

Biology | Nutrition and Digestion

Target Year Group(s): Years 8-9

Students will design an all-in-one ration snack, taking into account energy and nutritional needs when expending a lot of energy. The snack needs to provide the right balance of nutrients and remain safe and stable under a wide range of temperature conditions.

Chemistry | Materials
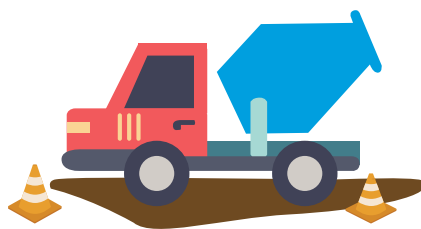
Target Year Group(s): Years 8-9

Students look at how to design a protective, lightweight helmet made of composite material. It must be strong and resistant and allow a range of accessories to be attached. Students need to explain how they have combined materials with different properties to provide comfortable, lightweight protection.

Physics | Heating and Thermal Equilibrium and Physical Changes

Target Year Group(s): Years 8-9

Students look at designing and explaining how a cooling suit will remove heat and allow soldiers to work safely and in comfort without overheating in tropical/arid environments.

CONSTRUCTION

Construction Taster Days

Target Year Group(s): Year 9
Participant Numbers: Up to 100 in total
Date: Autumn term, October-November 16

Delivered off-site, these day-long taster events for year 9 students at schools in and around the county serve to promote professional and technical roles within the construction sector through a combination of presentations and activities, led by local construction firms. We'll look to build upon student interest as they move into year 10 by securing work experience placements and group visits with those same local companies.

CITB CREST Awards

Target Year Group(s): Years 9-10
Date: Throughout the academic year

The CREST Award scheme is managed by the British Science Association and helps young people to discover their passion for Science, Technology, Engineering and Mathematics (STEM) subjects. Many CREST projects develop students' knowledge and skills, supporting their attainment in national curriculum subjects and qualifications. CREST Awards are highly regarded and are the only STEM scheme endorsed by UCAS for students to highlight in personal statements.

The Construction Industry Training Board has developed three CREST challenges for construction and the built environment – 'Sustainable Communities', 'Building Bridges' and 'Casement Park SOS'. Available at Bronze, Silver and Gold levels, students will be supported by CITB professionals and afforded the opportunity to gain exposure to the local construction sector.

IT, DIGITAL AND CREATIVE

'hACKT' - Essex Employment & Skills Board & Mercury Theatre Digital Summer School

Target Year Group(s): Year 9
Participant Numbers: Up to 100 students in total
When: Summer term

hACkT is a week long summer school for young people aged 11-16 to explore drama and theatre making through digital technology and computer game design. Young people will work with **Mercury Theatre** professionals, **Teaboy Games**, a Colchester based app and game design studio, and **BBC Radio One Presenter** Julia Hardy and can expect to use drama, video game design software, choreography, **Raspberry Pi**'s, filmmaking and coding to experiment and explore the possibilities of digital creativity.

VEX IQ Robots

Target Year Group(s): Year 9
Participant Numbers: Up to 100 in total
Date: Date convenient to school

With the growing societal need to enhance science, technology, engineering, and mathematics (STEM) instruction in classrooms and beyond, there is a call for integrated learning programs that allow teachers to engage students meaningfully in STEM, especially at the elementary and middle school levels. As the ideal platform for exploring important STEM fundamentals, VEX IQ is proud to offer a twelve-unit curriculum mapped to national standards and ready for classroom use.

ADVANCED MANUFACTURING AND ENGINEERING
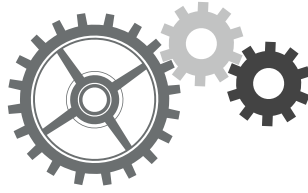
ADS Build a Rocket Competition

Open to all age groups with no team member cap. Please note ECC will only fund teams consisting exclusively of E&I STEM Programme pupils.

Date: Regional competition event in Summer term

The UK Aerospace Youth Rocketry Challenge (UKAYRoC) has proven a huge success in recent years. Teams of students are tasked with building rockets in order to reach a target height, release its payload and see it return to Earth unscathed. Organised by **ADS**, this is an exciting way to learn more about maths and science, with the UK winners getting to compete with international winners.

UKAYRoC - Regional winners Shenfield High School 2015 | National third place winners Stewards Academy

Assisted Living Technologies Engineering Project

Target Year Group(s): Years 9-11
Participant Numbers: Teams of eight to ten students comprised of Health and Social Care, Engineering or broader-STEM
When: Spring/Summer term

To design and build a prototype of an assisted living technology that will make a positive impact on the lives of residents in care homes across Essex. Students will choose to focus on one of a number of categories. ▶

▶ Teams will be linked to care providers in Essex to initially work to research and understand the uses of such technologies locally, and get a feel for the gaps/areas for improvement. Students will visit care providers to meet residents and staff in order to come up with and then develop their idea. Teams will then be linked to a local engineering company to assist in the process of building the prototype. Teams will gather for the final event where they will present to a panel of judges – taken from engineering and social care backgrounds. Teams may work on the project in after-school clubs, or indeed as part of the subject curriculum.

Bloodhound Microbit Car Challenge

Target Year Group(s): Years 7-11
Participant Numbers: Teams of four to six students
Date: Summer term

Teams are tasked with building a model rocket-powered vehicle integrating Micro:bits that have been coded to act as accelerometers that will be 'fired' through a timing gate, along a steel wire. Schools will be linked, prior to the final competition event, to engineering experts to support the design and build process.

Build a Bridge Challenge

Target Year Group(s): Years 7-11
Participant Numbers: Teams of four to six students
Date: Date convenient to school

Ambassadors from civil engineering and construction will support students to design and build a bridge using wooden sticks and glue. At the final, the students' bridges will be attached to a jig and slotted weights will be added until the bridge snaps under the weight.

Colchester Zoo Engineering Project

Target Year Group(s): Years 7-11
Participant Numbers: Teams of four to six students
Date: Summer term

Following on from the success of this year's competition, students will work in teams, with support from local engineering and IT companies, to design and build a prototype feeder for one of **Colchester Zoo**'s animal enclosures. The winning entry will be built by participants and installed into the enclosure itself.

Colchester Zoo Engineering Project - Sun Bear Feeder Competition

Drone Build & Flying School

Target Year Group(s): Years 7-9
Participant Numbers: Groups of three (up to four groups)
Date: Autumn term | October onwards TBA

The Boswells Computing Department are offering on a Saturday morning (10:00 - 12:30) the chance for students to come along to learn how to build and fly quadcopters. This will be run in conjunction with the STEM Programme and will be run over a series of 6-8 weeks where students can practice their flying on a simulator and understand the construction of a drone so they will be able to repair them and rebuild them as and when necessary. This will be run by teachers who are passionate and enthusiastic and lead a team of students to win National Raytheon UK Champion status. Since then they have set up their own drone flying school for Boswells students.

Pi in the Sky

Target Year Group(s): Year 9-10
Participant Numbers: TBC
Date: Summer term

Students will be asked to assemble, program and test a device capable of tracking the location of a high altitude balloon. They also have to design and assemble a suitable payload container, considering environmental conditions in flight and safety on landing while monitoring and capturing data throughout the flight for analysis afterwards. In this project students learn the basic operation of a raspberry pi, along with its applications and limitations. Students also learn basic theory of radio and frequency-shift keying (FSK) modulation, along with how it is used to send data.

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PiBots

Target Year Group(s): Years 9-10
Participant Numbers: TBC
Date: Summer term

Students are tasked with designing a Raspberry Pi controlled, programmable buggy. Using a Raspberry Pi and its GPIO pins, your students can program the PiBot in whatever language you like, from Scratch, to Python and C, via Basic, Logo etc. Anything else that works with a Pi can be interfaced, so that means, Raspberry Pi camera, WiFi, LCD screens - the sky's the limit!

HEALTH AND CARE

Developing Careers in Health at ARU

Target Year Group(s): Year 12
Participant Numbers: Up to 80 in total
Date: Spring term, February 2017

Anglia Ruskin University

Health and Social Care students will benefit from a range of presentations and activities, delivered by staff at **Anglia Ruskin University** and industry representatives, serving to highlight the variety of Health-related careers and courses on offer at the University.

Developing Careers in Health - Anglia Ruskin University

Developing Future Social Care Leaders Programme

Target Year Group(s): Years 9-11
Participant Numbers: Schools to nominate up to four students
Date: Throughout 2016-17

Social Care (or with aspirations to work in caring professions). Sessions will be predominantly industry-led, and will serve to highlight the fantastic opportunities available in the sector (and of course salaries!), inform students about the breadth of roles and responsibilities and link potential employees to local companies that expect to be recruiting in the coming years.

Health and Social Care Scenario Events

Target Year Group(s): Years 7-8
Participant Numbers: Up to 150 in total
When: To be agreed with clusters of schools

Students will gain insight into the range of professions and disciplines in the Health sector through this interactive day that includes a re-enactment of an emergency situation and workshops delivered by Health professionals.

Ri

ROYAL INSTITUTION MASTERCLASSES

Ri Computer Science Masterclasses

Target Year Group(s): Year 9
Participant Numbers: Up to 100 in total
Date: Spring term

These **Royal Institution** Masterclasses are designed to encourage, inspire and engage young people in the subject of Computer Science. ▶

▶ Masterclasses are organised regionally and take place on Saturday mornings, with able and mechanically minded students attending from local schools. There are typically at least six 2½ hour classes in each series, with each class being given by a different speaker who is passionate about sharing their own experiences and enthusiasm for the subject. Speakers come from a variety of industries, academic and teaching, and topics have ranged from cyber-security to informations technology.

Ri Engineering Masterclasses

Target Year Group(s): Year 8
Participant Numbers: Up to 30 students in total
Date: Autumn term (Oct. & Nov.)

The highly successful Royal Institution Engineering Masterclasses are back this year to inspire students in the various possibilities of Engineering and connect their academic knowledge to practical skills in the industry.

Ri Science Engineering Masterclass Session | Hanon Systems

Ri Mathematics Masterclasses

Target Year Group(s): Year 12
Participant Numbers: TBC
Date: Autumn Term (Sep. & Oct.)

The Masterclasses are a series of hands-on and interactive extracurricular sessions led by top experts from academia and industry. The Masterclasses aim to open the eyes of young people to the excitement, and value of maths and inspire the next generation. *Please note this will be run out of Billericay School, Billericay.*

Customised Projects

Please note that the Education & Industry STEM team are happy to help create personalised projects with your school. If you have an ideas please let us know as we can help assist.

Other STEM Projects

If there are any other STEM projects which you are aware of that your school would like to take part in, please notify us.

ACTIVITY PARTICIPATION FORM

In the boxes below please select the activities that you would like your school to take part in for the 2016-17 academic year. You will need to provide us with notice of six weeks if your school can no longer participate in the planned activity. Date confirmations, reminds and relevant information will be sent for each project when appropriate.

Term and Project	Tick
Autumn Term	
Build a Bridge Challenge	
Construction Taster Days	
Royal Institution Mathematics Masterclasses	
Spring Term	
Developing Careers in Health at ARU	
Royal Insitution Computer Science Masterclasses	
Summer Term*	
ADS Build a Rocket Competition	
Assisted Living Technologies Engineering Project	
Bloodhound Microbit Car Challenge	
Colchester Zoo Engineering Project	
'hACKT' Summer School	
Pi in the Sky	
Pibots	
Royal Institution Engineering Masterclasses	
Date Convenient to School in Question	
CITB CREST Awards	
Developing Future Social Care Leaders Programme	
Health and Social Care Scenario Events	
Royal Institution Science Shows	
STEM Speed Networking	
VEX IQ Robots	

School Contact Details			
School Name and Address			
Lead Teacher Name (Mr/Mrs/Miss/Ms/Dr)		Department	
E-mail address (Block Capitals)		Phone	
Signature		Date	

Additional Staff			
Teacher Name (Mr/Mrs/Miss/Ms/Dr)		Department	
E-mail address (Block Capitals)		Phone	

Confirmation			
I have had my planning meeting with an E&I STEM Programme member regarding 2016-17 (if 'NO', please identify a meeting time).	YES/NO	If 'NO' Define Meeting Date	

Additional Comments:

Please note: if you have selected one of the events which states 'Date convenient to school', we will try where possible to accommodate, the desired term or start date. If there is a high demand from other schools for a particular term/date – we will accommodate the majority vote.

Please complete and scan back to fern.gower@essex.gov.uk or send information via excel file/e-mail.

*Please note competition finales are planned for the summer term, however school teams may choose to conduct the planning and development earlier in the school year.