Autumn 2018 Funded Projects

Broadening Horizons & Raising Aspirations - Engineering for All
Axholme North Collaborative Trust
Location: Yorkshire
Type of School: Primary , Secondary
Ages of participating children: 5-7 , 7-11 , 11-14

As a Collaborative of rural schools, the group is committed to raising the aspirations of not only the pupils, but also the parents/carers. They look for opportunities to broaden the pupils understanding of the wider world beyond the North Lincolnshire.

This year the schools have established Engineering Clubs and appointed Digital Champions from within the pupil cohort. They are now looking to expand this work through the development of projects which use engineering to respond to the challenges, for some, of modern living. Each school involved in the project has been asked to chose one area of development taken from the Global Strem Award programme - thereby tying in the activities with a national award.

Each participating school will focus on one area of the Global Stem Award - Health & Nurtition, Transport, Entertainment, Shelter, Conservation, S[port, Exploration, Communication, Energy, and develop teaching materials appropriate to the chosen target Key Stage to be shared across the group. Schools will work with a nominated business partner to ensure real-life application to enable teaching and support staff to attend joint CPD sessions to improve knowledge and skills, and contribute to the end of project celebration event. The project will strengthen links between the participating schools through network meetings and Digital Leaders' Workshops.

Celebrating 50 years of inventions inspired by the first manned mission to the moon
FOLIO Sutton Coldfield
Location: West Midlands
Type of School: Other
Ages of participating children: 5-7 , 7-11 , 11-14

Celebrating the 50th anniversary of the first landing on the Moon, "Celebrating 50 years of inventions inspired by the first manned mission to the moon" will explore 50 key engineering technologies, concepts and/or inventions that developed as a result of research that made the Moon landing in 1969 a success. A programme of workshops will be delivered once a week for 10 weeks with 5 different technologies, discoveries or inventions being explored each week, giving a total of 50 different technologies/inventions. The workshop series will be repeated at an alternative time, to reach additional children (we have good evidence for this level of demand). Workshops to be timed so the final session of the programme falls on the weekend of the 50 th anniversary of the Moon landing. Participants will develop a basic scientific understanding to enable knowledge of the concept. Each hands-on session will combine the use of arts, crafts and/or drama along with science to learn new skills as well as the knowledge of the history of developments. Hands-on activities will be supported by linking to library resources on the relevant topics, highlighting book stock (fiction, as well as non-fiction) and online resources. There will be a clear focus on linking space technologies with the impact they have had on the every day life of the participants in the workshops, thereby driving home how engineering improves lives.

Engineering the Future
Techniquest Glyndŵr (operating name of North Wales Science)

Location: North Wales
Type of School: Primary , Secondary
Ages of participating children: 7-11 , 11-14

One of the greatest engineering inventions of all time is the automobile. This invention has had one of the biggest impacts on the world, changing not only how people moved about and lived but also influencing business and the economy. Despite the success of the automobile, there are drawbacks to this invention. As they have become more popular, this has meant a large increase of vehicles on the roads. Vehicle accidents are now one of the leading causes of death, with a large number of people killed or injured across the world every year. As the automobile industry has grown it has started to look at how it can make cars safer on the roads, with the invention of air bags, indicators, seat belts and stability control all helping to make cars safer. However, engineers and manufacturers are coming to realise that most vehicle collisions are caused by human error. This has given rise to the development of the driverless car, with many leading car manufacturers starting to build on their autonomous car technology. Fully driverless technology is still at the advanced testing stage, and it is the school pupils of today who will be the engineers of tomorrow, designing and building these cars and trying to overcome all the problems therein. This project will introduce pupils to the concept of driverless vehicles, through a hands-on, technological programming challenge, and inspire them to consider the applications of such technology and the impact it has on the world around us.

Explore, Inspire, Build and Play
Stowmarket High School
Location: East of England
Type of School: Primary , Secondary
Ages of participating children: 7-11 , 11-14

Explore, Inspire, Build and Play is a project designed to incorporate exploring careers in Engineering, being inpired to learn how engineering can change lives and then building a structure that they will eventually use during their break. We want to work with a small number of our primary school students and our lower school students to work with professionals in the field to design and build a quiet space in the playground. We feel that when the students are outside they feel it is only noisy play and that some of our quieter students or struggling students shut themselves away inside to be away from the chaos. We want to create a space for them outside that supports their mental health in making it a quiet serene play space. It is important to us that our stuents see the different opportunities out there for them in the field of engineering and want to develop their knowedge by working with engineers to design and build such a space. A space the primary school students can then benefit from when they join us in year 7 - when its a big and scary place to be. This project will include workshops with professionals explaining their career field and seeing how Engineering changes lives as well as directly supporting their design and build processes for this project - using the professionals as inspiration and motivation to complete the project. It intertwines career development with primary transition and well being all in one project.

Fully Charged
Learn by Design LtdLocation: West Midlands
Type of School: Primary
Ages of participating children: 11-Jul

The 'Fully Charged' programme will bring together 1,000 young people and 100 teachers from 18 primary schools across the Midlands and Yorkshire with IET members and STEM ambassadors to explore STEM at hands-on, engineering experience days, followed by an in-school STEM project. The projects will build the transferable skills required to be an engineer and be entered into a

competition to find the most exciting and innovative ‘Fully Charged Engineering Idea’ for future energy conservation/use to improve our lives. The experience days will be delivered by science/engineering communicators from Learn by Design (LBD), supported by IET & IMechE members and STEM ambassadors trained to engage, excite and inspire learners about engineering. They will be in 3 locations during March 2019, Nottingham, Sheffield and Leicester. Through workshops and a power themed show the ‘Power Up’ show, the young people will explore how power impacts on our everyday lives, how it is generated, used and how it is wasted! We will highlight exciting new technologies being developed to conserve power for the future and encourage the participants to come up with creative new engineering ideas exploring how we can use alternative energies to power things in our everyday lives and how electricity can be integrated into innovative product ideas. The ‘Fully Charged’ competition launched on the event days and will run over 3 months until June 2019, when 2 teams from each school will be selected to attend a competition day to pitch their ideas to stakeholder representatives from IET, IMechE, EngineeringUK.

iDiscover - supporting young people and parents to learn about STEM
Inspire!
Location: London
Type of School: Primary
Ages of participating children: 5-7 , 7-11

iDiscover demonstrates to young people that STEM improves lives and many of the programme themes bring this to life. We show that ‘Engineering improves lives’ in particular by showing engineerings' relation to elements of everyday life (Year 1), the creative arts and activities we do for pleasure and enjoyment (Year 4) and how engineering is a job for the future and helping to progress society (Year 2, 3, 5 and 6 - discussed futher below). This funding application is for resources for two engineering specific themes of our programme – Year 1 ‘Robots and Machines’ and Year 4 ‘Showcase’. Year 1 are provided with lesson plans and resources to learn about robotics engineering, civil engineering, mechanical engineering and biomedical engineering as well as meeting professionals from a range of engineering backgrounds. Year 4 learn about the engineering roles behind the creative arts such as light and sound engineers, electrical engineers and production managers. They participate in a workplace visit to a theatre to learn about these key elements of London’s entertainment industry and how these roles bring enjoyment to audiences around the world.

Inspiration Rover
Location: East Midlands
Type of School: Secondary
Ages of participating children: 14-Nov

Exploring Mars is an enduringly popular topic and a great platform for improving lives through the wonder of engineering. Partnering with Derbyshire County Council’s Education Improvement Service (EIS), we will identify a gender-balanced group of 12 Pupil Premium pupils unlikely to normally participate in STEM outreach, particularly those at risk of not engaging with education or training. They will work intensively alongside engineers and university students at University of Derby (UoD) to help build a Mars rover, learning transferable engineering and confidence building skills. All will attend a celebration event at the National Space Centre (NSC) with further space-themed learning and inspirational speakers. Participants will showcase their work at Robot Day Derby 2019. To maximize engagement, NSC will provide a long-term home for the rover and the project team will also take it on tour to schools and events.

JCB Junior Innovators
JCB Global LearningLocation: UK
Type of School: Primary
Ages of participating children: 11-Jul

In an effort to maximise impact & tackle the issue of "building science capital" in primary & secondary schools, we have developed an innovative new resource that provides an asset needed to meet the national curriculum. This allows teachers to deliver the project lessons as part of normal time tabling, maximising inclusivity in Upper KS2. The teaching materials developed are 3 lessons around "Gears" "Levers" & "Problem Solving", made possible by the support of primary teachers who are hub leaders for the ASE & PSQM. The project consists of assembling the kit of laser cut plywood components, using this to establish the principles of gears & levers through investigative learning, & then solving the problems presented by the tasks. The project resource itself will be made available nationally through the PSQM, ASE & DATA hubs as a free resource (if schools wish to cut the parts themselves). Our mission is to reach every primary school in the UK. The Kits will cost approximately £16 per unit to manufacture. We have tested and developed the prototypes in schools, launching the final product in September at the ASE Conference. We are also developing a suite of Augmented Reality environments to enhance the project and to allow teacher to contextualise the learning. JCB STEM ambassadors will offer CPD & training, utilising the PSQM, ASE & DATA hub networks to reach all of the teachers. The funding is for production of the kits. All teaching materials & development is funded by JCB.

Primary Mechatronics Challenge
Lincoln University Technical College (School aged 14 - 19)
Location: East Midlands
Type of School: Primary
Ages of participating children: 11-Jul

The 'Primary Mechatronics Challenge' will introduce students from a number of schools across Lincolnshire to the use of robotics and programming in a real-world context. This will be delivered initially by way of a pre-challenge workshop, delivered by the primary school teachers, ahead of the visit by Lincoln UTC. The main challenge / activity will be organised, partially funded and delivered by Lincoln UTC. The Mechatronics challenge will build on our experience with STEM in primary schools, where we have previously set the task of constructing and operating a small-scale trebuchet. Through this new project we hope to introduce students to modern engineering concepts, with our links to industry providing support where required. Examples of how engineering, programming and mechatronics can be used to improve lives are plentiful. From domestic applications, such as autonomous vacuum cleaning, to bomb disposal and driverless cars – the activity aims to introduce students to many different engineering disciplines, demonstrating how they can work together to make tasks safer, easier and quicker. Automation and robotics are two areas of engineering that are likely to play a wider role in the lives of future generations than ever before - it is widely recognised that automation has the potential to bring skilled labour into the UK jobs market. We hope to introduce students across Lincolnshire (a largely rural area) to these topics at a young age, with the intent of sparking their interest in the wider world of engineering.

Seeing the world through Engineers' eyes
De Montfort University, LeicesterLocation: East Midlands
Type of School: Secondary , FE
Ages of participating children: 11-14 , 14-16

We aim to engage with 10-16 year pupils with carefully engineered inquisitive activities which will fascinate young pupil, especially females, in developing their enthusiasm to contemplate a possible

future career in engineering. To achieve this, groups of young pupils from Leicestershire local schools and FE colleges will be invited to De Montfort University to engage in team activity of designing and making polariscope and 3D Hologram projector, which will help pupils to visually demonstrate fully three-dimensional images of the holographed subjects and predict their strength like engineers do. Engineers use a variety of techniques, including this visual technique, to analyse and predict the strength of engineering structures before putting them to use in real-life. This activity will help the pupils to understand, how engineering can help to mitigate the risk to improve the quality of life under the real-world constraint of limited resources. Furthermore, the pupils will be also engaged with an educational tour of the Mechanical Engineering department at De Montfort University, thus providing an opportunity for the young pupils to witness daily life of engineers and experience core-engineering equipment / facilities. We seek funding from EEGS to procure the material required to build polariscope and 3D Hologram projector, to carry out pupil-led experiments. Pupils will be able take home their hand-made Polariscope and 3D hologram projector. The goal of our EEGS project is aligned with our long-term mission to reach out to our young generation, especially girls, who are under-represented in Engineering especially in Mechanical Engineering.

STEM captains
All Saints Secondary SchoolLocation: Scotland SW
Type of School: Primary , Secondary , Other
Ages of participating children: 5-7 , 7-11 , 11-14 , 14-16 , 16-19

The pupils who are going to be taking part in these activities are fully committed to providing exciting clubs and activities in all areas of STEM. The activities that have been thought up by these young people are enriching the lives of the younger children who they are hoping to encourage into being interested in future careers in Science and Engineering. By starting early with these children, we are hoping to build on their 'Science Capital' which is a term used in a study which suggests that children are not likely to become interested in engineering past the age of 14 years old. By having pupils with already a high level of Science Capital in our school who are willing to pass on their knowledge and experience, we have been able to enthuse the younger S1 students in previous years and excite them about the world of science and engineering. This year, we are hoping to take our acvtivities into Primary schools and nursery schools with the idea that we can build science Capital at an early age to achieve the best results.

Technology and funding for Primary School Engagment
PLT [Procter Learning Technologies]
Location: West Midlands
Type of School: Primary , Secondary , FE , Other
Ages of participating children: 5-7 , 7-11 , 11-14 , 14-16 , 16-19

We offer 1.5 to 2hr STEM workshops which focus on Engineering and Science with curriculum links. All our workshops are hands on to include the most challenging students. If four workshops are completed by the students then we are able to offer a CREST Discovery award. Our workshops include, structures and bridges, collisions and crumple zones, acceleration and deceleration using vehicles contructed by the students. Within the workshops the students investigate aerodynamics, drag, forces, mass etc. We also have the BBC microbit and Robotics workshops which work extremely well within 1.5 to 2hr sessions. Our focus is to get the students focused on science and engineering so they can have fun and also learn in order to promote that light bulb moment which switches them on to their studies and future careers within the field of science and Engineering. We are mainly working with 11 to 25 year old young people, but feel we need to reach the students at Primary School level so they can take their interests and aspirations further forward along their eductional journey and adventure. The two weeks we offer (Robots / Cars) for 16 to 24 years olds

have been very successful in discovering their engineering abilities, building their confidence and personal and social development. Many have either returned to education or applied for an engineering apprenticeship with the follow up support from the Prince's Trust. We target the needs of underprivileged young people and encourage STEM careers for all genders.

The Art of Engineering
Enfield Town Schools' PartnershipLocation: London
Type of School: Primary , Secondary , Other
Ages of participating children: 7-11 , 11-14

We want to build on the success of our recent STEM project and celebrate engineering with a new project which responds to 'Engineering Improves Lives'. This also links to our partnership priority 'to develop positive engagement between schools and the communities we serve'. We will deliver a term-long STEM project called 'The Art of Engineering.' Year 5 primary pupils (aged 10) will engage in engineering workshops delivered by HG Education and Robotics Limited and University College London Engineering Outreach (UCL). These sessions will explore the fundamentals of engineering and demonstrate different engineering technologies including how things work and move. Pupils will: Engage in engineering workshops delivered by external organisations to develop an understanding of engineering and generate excitement and engagement with the project. Visit our special school (Waverley School) to meet their pupils and understand their needs and capabilities in order to design/create something in response to this which could improve Waverley's pupils' wellbeing/daily lives. Be encouraged to think about other peoples' needs and how in designing something to support them they could be a potential future engineer. Showcase their science projects to their school community who will vote for the 5 best projects to represent their school at our science fair. The science fair will include a carousel of different engineering and STEM activities and opportunity for pupils to engage with STEM Ambassadors from a variety of STEM backgrounds who will also be judging the pupils' work. Staff will receive specialised STEM CPD to enable them to support pupils.

The Internet of Curious Things
Foundation for Digital CreativityLocation: Yorkshire/Midlands/North of England
Type of School: Primary , Secondary
Ages of participating children: 7-11 , 11-14

The Internet of Curious Things empowers young people to invent with smart sensors and develop their engineering skills to make a smarter, more connected world. The emphasis on engineered solutions to improve lives, linked to the United Nations' Sustainable Development Goals, gives purpose and real world relevance to learning. Alongside digital making workshops in schools for 7-14 yr olds, a professional development programme will equip teachers with the knowledge, skills and confidence to deliver a range of hands-on challenges in their own classrooms. Activities will include problem finding and exploring engineering trade offs to invent an internet of things solution capable of transformation. This next phase of the programme additionally creates a network of support for engineers and teachers, with the launch of 5 regional 'Engineering in Education' hubs across England. These networks will help to sustain the project with legacy from development at practical workshops and sharing best practice from activities nationally. Children will acquire technical knowledge alongside social understanding as the workshops extend, develop and excite groups engaged through STEM innovations. They will select and program sensors onto the connected and wearable device to collect environmental data in a fun way to support problem solving. Along their coding journey, they'll understand and analyse the live data they collect through the online portal with another chance to collaborate with peers sharing bigger datasets.

Location:
Type of School:
Ages of participating children:

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