

## Autumn 2020 Funded Projects

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### **Primary school successes, ages 7-10**

#### **Engineers Don't Sing**

*Cornwall Education Business Partnership (CEBP), All UK regions*

We have teamed up engineers at Exeter University and music/theatre maestro Seamas Carey to create engineering-themed musical theatre! Working with young people, teachers and engineers around the theme 'What is an Engineer?', to create a highly shareable mini YouTube musicals; to aid teaching nationally, alongside a free live streamed theatre performance. The content of the performances will be co-created through STEAM workshops with engineers and primary school children, using the passion, enthusiasm and real-world stories of engineers to create fun, memorable and curriculum appropriate musical learning experiences. The YouTube content will be performed primarily by engineers – hence the title. Musical theatre was chosen as a medium for engagement to juxtapose stereotypes around engineering and reach young people and families who would not normally be engaged with engineering themes.

#### **Virtual Aquarium**

*Ocean Conservation Trust, South West*

The project is a digital design & engineering programme showcasing the role of digital platforms in engineering and inspire young people to take up STEM-linked independent learning projects. 140 KS2 students across five Plymouth schools will take part in the project, through which they will design, build and code their own virtual aquariums. In order to achieve this, participants will be introduced to digital design using the Co-Spaces application and shown how to create programmable virtual environments using computer code. Upon completion of their designs, the students will be taught how to upload their aquarium's into Virtual Reality headsets and given the opportunity to explore them. Following the conclusion of this work, the project will create a set of resources and offer CPD to the wider teaching community, promoting and supporting the development of STEM engagement within schools across the region.

#### **Making A Better Tomorrow, Today**

*Kaleidoscope Multi-Academy Trust, South West*

We will launch a STEM challenge across all of our schools for pupils in Years 5 & 6. The challenge aims to inspire the next generation of scientists and engineers whilst helping to bring about change in the wider community. In collaboration with peers, teachers and our engineering advocate, pupils will meet with local organisations that help the community such as the RNLI, Foodbank, homelessness charities to identify a problem that needs to be solved/improved. Pupils will work in small groups to research how engineering or technology can address this problem before moving onto the design stage. Local business/experts such as Bristol Aerospace, Rolls Royce, BAE systems will then be invited to work alongside the pupils, give their opinion on the designs and offer areas for development. Children will then be taught how to use child friendly Computer Aided Design (TinkerCAD) to transfer their design onto the computer; before evaluating its effectiveness and making changes. Once the design has been agreed by all members of the team and outside agencies, pupils will use 3D printing to produce a prototype of their idea. At which point, they will develop a Dragon's Den style pitch ready to share their idea, personal growth and their developed skills in STEM with a specially chosen panel of experts (inc our advocate). An overall winning idea will be selected.

#### **Engineering Sustainable Futures**

*Bloodhound Education, South West*

This project will aim to create an interest in and awareness of STEM careers and opportunities, through exploring new innovative applications of engineering and broaden pupil knowledge of sustainable technology. It will enable us to develop an exciting new interactive activity to add to our education offer for schools and train and equip teachers from primary schools with a free sustainable 'Bloodhound toolkit' with all the resources required for running the activities multiple times and further projects. Aimed at KS2 with optional stretch for higher ability and KS3 pupils and designed for flexible delivery to assist teachers and parents with the Covid challenges of remote and virtual learning.

Using the development of land speed record cars and Bloodhound LSR as a spark, the activities will introduce pupils to the technology and language before exploring real examples of the cleaner and smarter technology that will power future vehicles to the infrastructure in our buildings and cities that will make them active using the Internet of Things. It will target 10 primary schools in Gloucestershire, particularly those with in disadvantaged areas with pupils who might not otherwise have the opportunity to engage in fun, practical STEM activities, or consider raising their aspirations to a career in STEM. Teachers will have CPD training, be supplied with a toolkit and receive ongoing engagement and support from the us, Ambassadors and engineers from our Education Centre at Gloucester Science & Technology Park.

## ***Primary and Secondary successes, ages 7-16***

### **Invent Plus with Southampton Hub**

*Student Hubs - Southampton Hub, South West*

Invent Plus is a volunteering programme by Southampton Hub, aiming to introduce primary school pupils to engineering through practical, student-led workshops. We run sessions in local schools, currently focusing on civil, mechanical, electronic, and aeronautical engineering, as well as the steps to follow throughout school to become an engineer. The schools we work with have a high proportion of disadvantaged pupils, so we intend to inspire schoolchildren to pursue engineering from not just a young age, but from backgrounds which might otherwise have prevented them from being exposed to STEM. Our ultimate goal is for our volunteers to inspire younger generations to pursue engineering, and help bridge the educational inequality gap in STEM. The social challenge tackled by Invent Plus is educational inequality in STEM. Few university students in STEM come from disadvantaged backgrounds, primarily due to a lack of physical resources, lack of access to extracurricular STEM activities, and lack of opportunities to be introduced to STEM. We realise that we cannot change an entire system, and as such do not aim to provide long-term education or tutoring. But we realise that by simply showing schoolchildren how exciting engineering can be through first-hand experiences, and by connecting them with university students to view as STEM role models, we can have a significant impact on individual children by sparking their interests, and potentially inspiring them to pursue engineering further in their lives.

### **DundeeBots - Developing Young peoples' Potential in Engineering**

*Scotland*

The project will explore, design and manufacture educational robotic resources with the active participation of young people from the local community. These resources will be based on open source design and hardware and will be influenced by the latest trends in the Makers movement. The project will put at heart young peoples' interests such as mobile apps and gaming, while promoting problem solving and critical thinking skills, and support their creativity. The project will primarily benefit the local community as workshops will be running in Dundee Central Library, Morgan Academy and other local community centres, but will also benefit the wider community as online resources will be created and available to all. There will be a strong focus on communication through documentation, online media and peer education, as resources will be tested and improved upon with the involvement of workshop participants at all stages of the engineering process, from initial ideas, design and manufacture. This project will be supported by a monthly professional meetup organised for educators to discuss feedback and experiences from robotic activities, exchange and explore new ideas and share knowledge, with guests invited from the industry. The project will secure continuity involving local financial stakeholders, as the project matures, delivers and builds participants' resilience.

### **Engineering for Everyone**

*Sphere Science, Greater London*

Engineering for Everyone is about making an engineering career a realistic possibility for young people in the North Kensington area. Westway Trust Supplementary Schools supports progress for children both in mainstream schools and later in life and we will use these supplementary schools to reach secondary students in communities in difficult circumstances. The project aims to develop the secondary students' skills and confidence while introducing engineering as a career. *Phase one – phase three.* Through presentation of practical STEM activities to younger children and families the secondary student can improve their STEM confidence and knowledge. *Phase four.* Cascading science communication with peers will support their in-depth understanding of science. *Phase five.* Young people can create an informed picture of engineering and engineering careers by speaking to engineers and technicians sharing their own career paths and engineering experience. These benefits to the secondary students will impact on local primary aged children and families through the science shows, workshops and family days they will attend.

## **Primary, Secondary and Further Education successes, ages 7-19**

### **Engineering in a box**

*Reach South Academy Trust (RSAT), South West*

Created by the University Technical College (UTC) Plymouth to give all RSAT KS 2 children in our 13 primary schools a chance to build a project with the contents of a box that inspires, educates and connects them in a fun way to science, technology, engineering and mathematics. The boxes will be created in partnership with our older students in KS 5 alongside 5 leading industry partners. With support from our IET advocate and our specialist teachers we will also create a range of engineering project activities (e.g. electrical, mechanical, civil, environmental, biomedical) to allow our primary school classroom teachers / STEM club supervisors to facilitate "project in a box" activities. All will contain general reusable project equipment to ensure continuation into the future. The resource provision will run alongside RSAT's STEM training and outreach programme, to allow primary colleagues to be upskilled in the use of, and classroom instruction for, the equipment. In parallel, we will make short videos to support both the training of the primary school teachers and to "show and tell" the children about our industry partners and our KS 5 students and their passion for STEM. We will also share all aspects of the project with education networks (e.g. STEM learning) and appropriate social media platforms; making our lesson plans freely available for others to use.

### **StrongWomen Science (SWS)**

*Circus250, All UK regions*

SWS is a science circus show for children and families. We want to include engineering in the show, expressed through circus, we currently include physics and chemistry. In this way, engineering is made easy for all, both as audience and participant. SWS is accompanied by hands on workshops for children, allowing them to experiment with engineering ideas in a fun and accessible way. We will take this re-engineered show on tour in late Spring 2021, including; Lapworth Museum (Birmingham), British Commercial Vehicle Museum (Preston), Just So Festival (Cheshire), Festival of Thrift (Redcar), Bolton Library and Salisbury Playhouse. We're eager to take exciting engineering experiences for young people beyond usual spaces (schools and science fairs) to places where families with low science capital might attend (ie community venues, libraries, museums). This application is for the devising and rehearsal stage, plus resources; we expect the tour itself to be self-financing. We will also make a short film for free distribution on YouTube and our website that explains an engineering idea from the show. Similar short films are on our Circus250 YouTube channel 'Balancing' and 'Custard Juggling'. A fully designed online downloadable resource will accompany the engineering film. We will produce a Visual Story to support audience members with autism and other related disabilities better access the performance and workshop, distributed free to all venues, audiences and online.

### **ESC-Live: Virtual, out-of-the classroom events connecting school children with engineers**

*Exeter Science Centre, South West*

An exciting new way to get students virtually out of the classroom, via a live, interactive documentary-style experience. In this project, we will visit a range of organisations across the South West on the theme of Energy and Waste, transmitting these visits live to mainly disadvantaged schools in the local area, taking questions from students to direct our investigations. We will visit engineers in industry and Universities; wind and solar farms; wave and tidal research sites; geothermal, anaerobic digestion, energy-from-waste and nuclear power plants. Using innovative mobile journalism techniques which can be transmitted live over the internet from almost any location, this immersive and interactive experience should make students feel like they are there in the labs or on-site, without the current difficulties of a conventional field trip. In these educational events, the students will learn about the science and technology behind current and future innovations in the Energy and Waste industries, and understand the important and varied roles of engineers in these endeavours. The South West is a hub for energy innovation, being the birthplace of industrial energy, now the home of pioneering work in renewable energy engineering. This will be a unique and impactful way for students to "meet" the experts in their region, and be inspired by their work and enthusiasm for making a difference in society. To ensure an even broader reach, we will produce short, informative and engaging YouTube videos for the general public which summarise each visit.