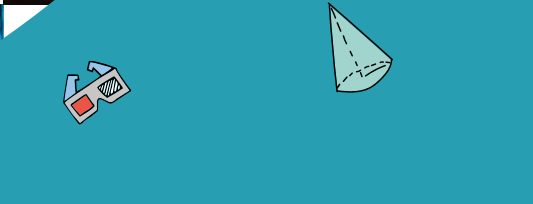
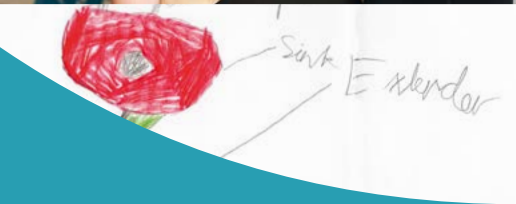
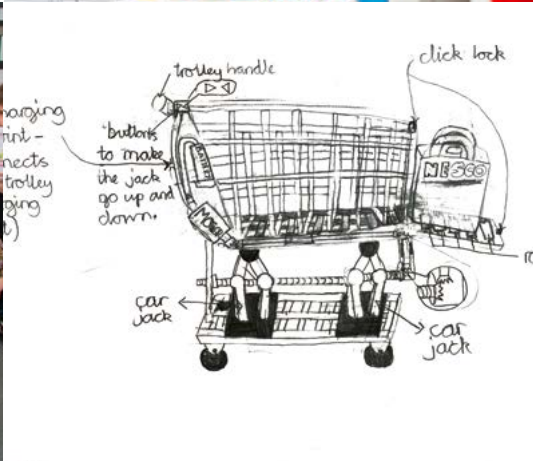


10 YEARS OF 'MAKING A RIPPLE'

Primary Engineer's 'If you were an engineer, what would you do?'
Leaders Award Report 2023



IF YOU WERE an
ENGINEER
WHAT WOULD YOU DO?®





Primary Engineer®
...the first step

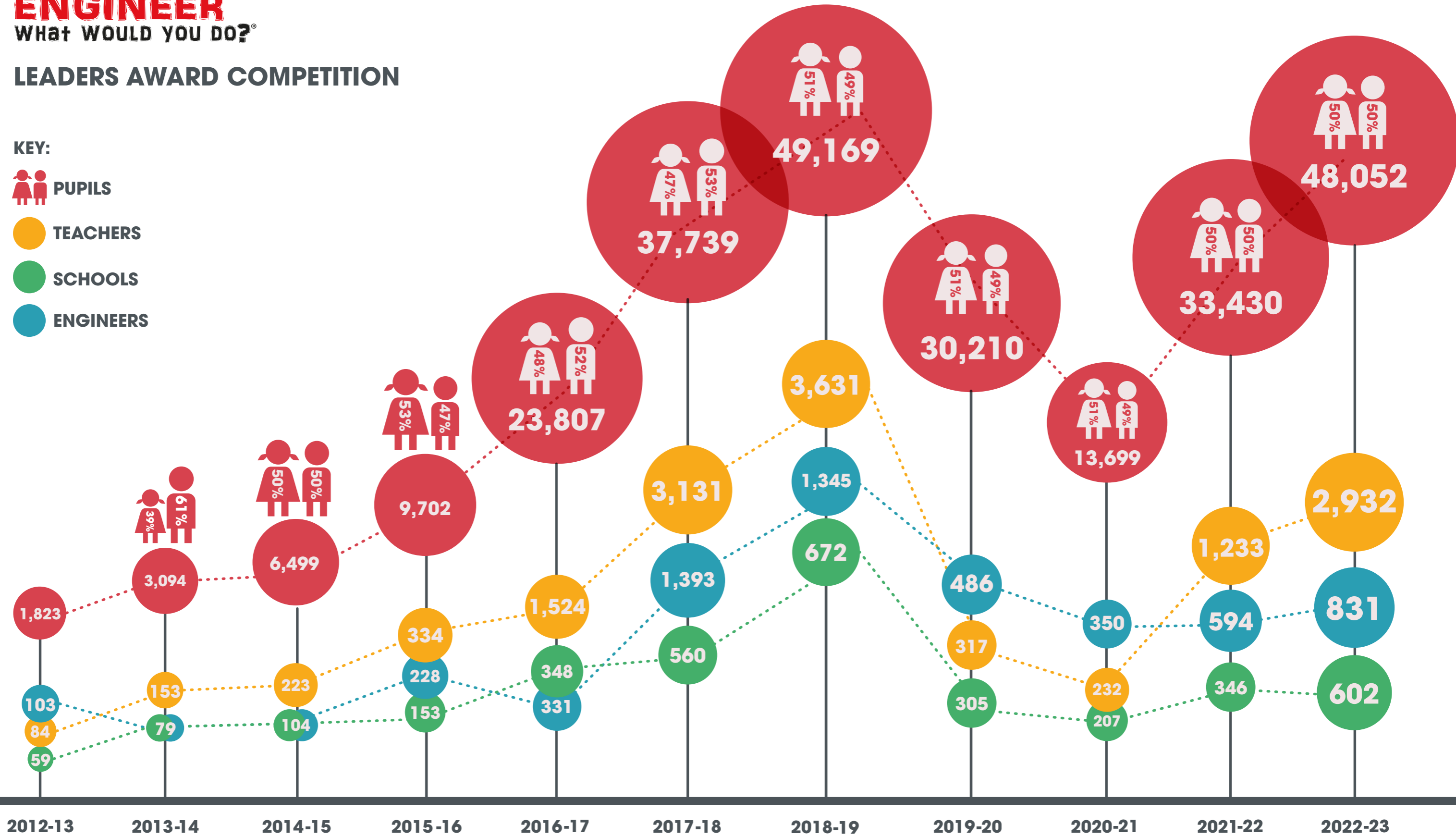


IF YOU WERE an
ENGINEER
WHAT WOULD YOU DO?®

LEADERS AWARD COMPETITION

KEY:

-  PUPILS
-  TEACHERS
-  SCHOOLS
-  ENGINEERS



Project Timeline

Total number of participants: **257,224**

This report and its outlined analysis have been developed by Dr Rory McDonald with support from the team at Primary Engineer. Dr McDonald is an experienced evaluator of educational programmes and researcher of STEM education, most recently examining the concept of 'engineering capital' amongst young learners. He has collaborated with Primary Engineer for a number of years in an evaluation and research capacity.



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2012-2013

Pilot Year Scottish Engineering Special Leaders Award.

1,823
School Pupils

84
Teachers 

59
Schools 

103
Engineers 

1
Awards Event 

1
Exhibition 

Introduction



Introduction: Making a Ripple

Primary Engineer was founded in 2005 and delivers a programme of engineering-themed content via teacher training and resources, as well as by linking engineers into primary classrooms. Its core aim was to increase the number of young people able to recognise engineering as a career for them.

The challenge was a significant one; our approach was to offer engineering taught in a whole class settings, using a cross-curricular, project-based approach that offered learners an opportunity to apply and reinforce learning, build resilience and develop curiosity. These learners and their teachers knew little about engineering and had little idea as to the breadth and range of engineering we were trying to open a door onto.

In its original format, the Leaders Award was one of our earliest project ideas, although the format in late 2005 was quite different to that of today. Then, we had only three levels (primary, secondary and advanced), and the challenge for learners was to write magazine-style interviews with engineers focusing on different themes: females in engineering, the use of maths in engineering and so on. We then chose the best learners from the three age groups and presented awards. To launch the award, we arranged a series of interviews with a group of secondary learners who we took to meet Nobel prize winner Sir Harry Kroto and fellow scientists at the Royal Society in 2005. In this format, the learners were able to ask the questions that they, and others like them, wanted to know the answers to. This provided the insight we needed to create the competition format we have today, where we enable learners to ask questions rather than provide them with answers.

At this early stage, the learners would find the engineers and we would publish their articles. While some amazing interviews took place and insights were gleaned, the number of learners was always limited, and the award was often an extra-curricular activity, so we needed to adapt to fulfil our aim of reaching more learners.

The Leaders Award rolled on in this way for a number of years, and it wasn't until 2012, when we began to work in Scotland, that we saw an opportunity to reshape and adapt the programme so that it could reach many more learners, teachers and engineers. A new focus on problem solving would demonstrate the breadth of engineering and associated careers, and this shaped the current format of the 'If you were an engineer, what would you do?' Leaders Award competition.

The new idea was simple: give learners the opportunity to interview engineers about their work and use that information to identify a problem and find a solution for it. Later, the idea of adding a letter to engineers explaining why their proposed solution should be made was introduced. This was the origin of the strapline 'Make a Ripple'; engineers taking the time to talk to learners about their work would be like a pebble thrown

Introduction

into a pond, its impact radiating out and inspiring everyone involved in the competition.

At first glance, engagement with an engineer goes only one way; engineers give their time, and learners and teachers gain insights and knowledge. However, the engineers' role doesn't stop there. As engineers recognised the interest from their audiences and saw the quality and ingenuity of their competition, it gradually became clear that the engineers we hoped would inspire learners were being inspired themselves. All involved will remember a question or a solution to a problem they have been awestruck by, and many will still be dining out on those stories!

The competition is aimed at individuals, not teams, allowing all pupils to consider what engineering means to them on a personal level, and to follow paths reflecting their own interests and experiences. This level-playing-field approach focuses on the quality of the solution, not the quality of the drawing or the grammar of the explanation; we ask engineers to look past that and focus on the problem and the solution. At the outset, we hoped to see a range of problems that learners wished to solve, but what has proved overwhelming has been the types of issues that learners have identified as requiring a solution: learners of all ages look to make life better for others, to take care of the environment and to tackle climate change, transport, accessibility, mental health and wellbeing, frequently solving problems that we didn't know needed solving while remaining mindful of others.

We have been privileged to have been given insights into the challenges young people see around them and what they see as requiring engineering to be resolved. What can we take away from this? That young learners see engineering not only as creative problem solving, but also something that is innovative, entrepreneurial, sensitive, caring for those that need help, and the solution to climate change, transportation and big society challenges. That's what these learners, from 3 to 19 years of age, see engineering as being; quite literally, it is the answer to all our problems.

For all involved, the feeling you are left with is the recognition that these young people 'have it', that everything is going to be okay; we, the adults, are the ones left inspired and grateful. Our role now is not only to continue and grow the opportunities for even more learners to engage, but also to ensure that the support is in place to help them realise their ideas, encouraging their onward journey into engineering and to making the world a better place.

Thank you to all that have joined us on this journey so far for your continued support.

Susan Scurlock MBE
CEO and Founder Primary Engineer

2013 - 2014

Scottish Engineering Special Leaders Award.

3,096
School Pupils



153
Teachers



79
Schools



79
Engineers



1
Awards Event



1
Exhibition



15
Winners



Report Summary

Since 2012, Primary Engineer have offered the 'If you were an engineer, what would you do?' Leaders Award competition, a creative, problem-solving engineering education competition for learners across the United Kingdom.

This competition invites learners aged 3 to 19 to imagine what problem they would most like to solve if they were an engineer. From there, learners complete a series of activities to develop a richer understanding of engineering and the importance of its role in society. Participants are encouraged to interview an engineer, ask questions that engage their curiosity and identify a problem that engineering can solve. Having identified a problem that matters to them, they next design, draw and annotate an engineering solution, before writing a letter explaining to an engineer why it should be built. The creative design experience of the Leaders Award competition aims to guide learners to develop stronger understandings of engineering and its practice in the world around them, broadening their knowledge of the engineering sector and careers within. These activities provide learners with the opportunity to practise a range of skills relating to creativity, observation, critical thinking, problem solving and visual, written and verbal communication. More than a quarter of a million entries have been submitted to the competition in its decade of operation, each of which represent a young person engaging in a substantial engineering learning experience.

In 2022/23 alone, an estimated 384,416 hours of engineering learning took place in support of the Leaders Award competition.

The competition is designed to also benefit the teachers and engineers who deliver and support the project.

The following report explores the impact that this competition has had on learners, teachers, schools and engineers since its launch in 2012. This analysis draws on historic evaluation data and reports, as well as new data collected for the tenth anniversary of the Leaders Award competition including surveys, testimonials and interviews with students, teachers and engineers.

The report identifies a range of benefits stemming from the 'If you were an engineer, what would you do?' Leaders Award competition experience.

Learners are found to gain a greater understanding of engineering and its importance, adopt 'engineering habits of mind' in their learning, improve their knowledge of engineering careers and its role in shaping society, and develop aspirations to study or work in engineering roles in the future.

Many teachers are found to develop greater confidence with the subject of engineering in their practice, are more eager to take part in continuing professional development (CPD) sessions for engineering teaching to build on their skills and report wider benefits to their teaching of curriculum subjects such as Design and Technology/Technologies and Science.

Engineers are also found to experience the Leaders Award competition in a positive and fulfilling way that supports their understanding of the importance of nurturing future engineers. Engineers also report that the project aligns to the values of their companies, indicating the responsiveness of this competition to broader industry perspectives.

The report explores each of these impacts and outlines the legacy of support the Leaders Award competition has offered to schools and learners across the UK. The report closes with an examination of how these benefits can continue to be offered and developed further through the work of Primary Engineer.



2014 - 2015

Scottish Engineering Special Leaders Award.

6,499
School Pupils



223
Teachers



104
Schools



104
Engineers



1
Awards Event



1
Exhibition



15
Winners



What is the 'If you were an engineer, what would you do?' Leaders Award Competition



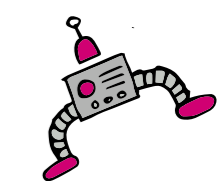
Since 2012, Primary Engineer have offered the annual 'If you were an engineer, what would you do?' Leaders Award competition, a creative engineering education project for learners aged 3 to 19 in the United Kingdom. This competition challenges learners to take on the role of Engineers in the Making™ to design an engineering solution to a real-life problem they find in the wider world. In the past decade, 255,401 competition entries have been submitted, representing over a quarter of a million engineering learning experiences for young people across the UK. During this competition, learners are expected to interview an engineer, explore engineering in the world around them, create their own annotated engineering design and write a persuasive letter to convince an engineer why their design is needed and should be built.

The Leaders Award competition was created to bring engineering into the heart of the classroom and to encourage a greater understanding of engineering, its breadth of practices and what engineers do. This involves highlighting the rich diversity of roles and practices that fall under the umbrella of 'engineering' in the UK. The competition is intended to be undertaken by whole classes of learners; this approach allows the competition to address engineering equality, diversity and inclusion challenges in the UK and to ensure a broad range of individuals participates in engineering learning experiences.

The project is designed to benefit not only the learners taking part in the competition but also their teachers and schools; they can advance their teaching proficiencies and curricula through the introduction of engineering design. The project has been carefully mapped to national curricula to support wider learning outcomes for subjects such as English, science, design and technology and, to an extent, art and design.

All competition entries are graded by engineering professionals and awarded personalised certificates to recognise the work of learners, teachers and schools. Regional events are hosted to further celebrate these future engineers through awards and public exhibitions of their work. Each year, in each of the regions, at least one submitted design is chosen and manufactured into a working prototype by a team of engineers at partner universities or, as of 2023, partner engineering companies.

The Leaders Award competition is offered at no charge to schools, who only need to fund the postage to submit their entries. Through participation, engineering is distinguished as an important creative and engaging practice that young people can get involved in now and in their future. The competition is designed to empower learners to believe in their own engineering problem solving abilities.



What is the 'If you were...

In 2012, the year of the competition's launch, 1,823 entries were received to great success, with participating engineers and schools eager to take part again.

Participant numbers increased each year, providing the opportunity to grow the project and diversify its resources and experience.

Further events were introduced, as were online interviews and podcasts to support schools with access to a broader range of engineers and engineering insights. These resources provide learners with the opportunity to discover what an engineer looks or sounds like and learn more about engineering, as well as about the personal stories of engineers as they went from school into an engineering pathway. ProtoTeams have also been introduced and tasked with selecting and building one of the designs submitted by learners each year. These builds have culminated in the awarding of Primary Engineer MacRobert Medals to acknowledge both the innovative work of participating ProtoTeams and the learner responsible for the design the team create.

The competition is now offered in both Welsh and English languages across the whole of the UK and is supported by dozens of influential partner organisations, including government departments, foundations, universities, leading engineering companies, trade bodies and professional engineering institutions. These key supporters are listed at the end of this report.

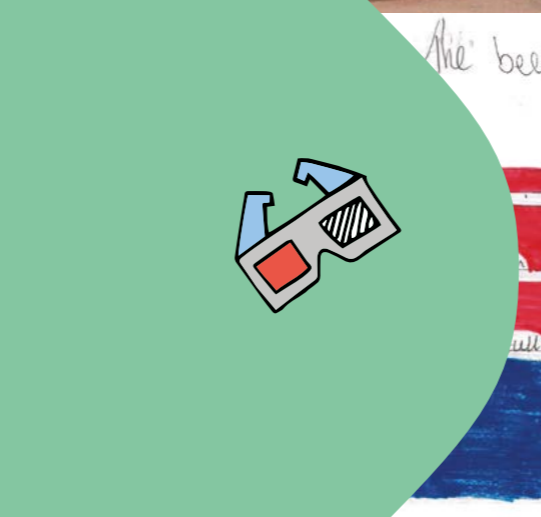
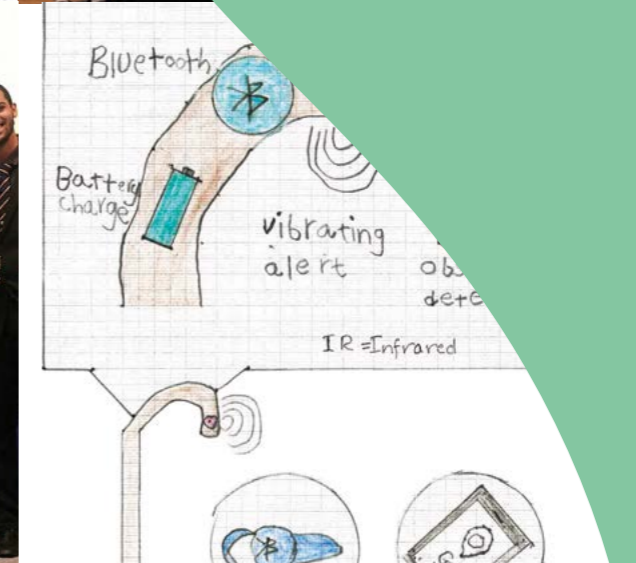
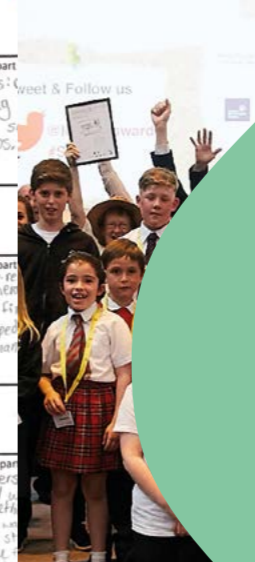
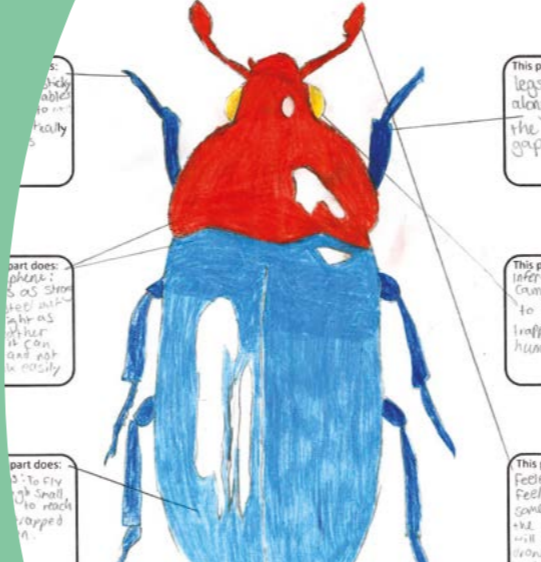
The 'If you were an engineer, what would you do?' Leaders Award competition sits within Primary Engineer's larger Leaders Award programme, which provides a suite of resources to support engineering learning in schools. These resources include recorded engineer interviews, podcasts, regional grading days, exhibitions and awards across the UK, a book celebrating 10 years of competition designs and the prestigious Primary Engineer MacRobert Medals for ProtoTeams involved in turning submitted competition entries into working prototypes. Teachers are encouraged to draw on these resources to support them in their participation with the competition and to reinforce the celebration and awareness of engineering more generally within their practice. Although the Leaders Award competition has grown to reach tens of thousands of learners each year, the underlying objectives of the programme have remained the same: to provide opportunities for young learners to engage with engineers, learn more about engineering and its breadth of practices and to celebrate the pure

innovation of learners who can use engineering to solve problems whether large or small. The competition is carefully managed to ensure it is accessible and manageable in the classroom. Teachers are only required to complete a short registration, supervise the completion of entries and submit these via post to Primary Engineer. In return, learners, teachers and schools are provided with rich learning experiences and resources designed to provide a range of benefits and outcomes.

Learners who take part in the competition are given the opportunity to build on their understanding of engineering as informed by the work of engineers in real engineering settings. This experience may be the first contact a learner has with the world of engineering and can provide a rich and personal experience that supports greater understanding and aspirations. By identifying a problem and developing their own engineering design solution, learners are supported in developing important engineering competencies through first-hand experiences as Engineers in the Making™. The grading of entries by engineers, and the awarding of personalised certificates, is designed to endow learners with a greater confidence in themselves and their potential as future engineers.

Teachers who take part in the competition are also provided with opportunities to learn more about engineering and the ways in which engineering can support learning in the classroom. Participating schools are supported to develop links with local engineers and engineering companies to establish a network of support to enrich learning. Curriculum learning and statutory guidelines for careers education in schools are also supported by the competition process and Primary Engineer's learning resources.

By offering a meaningful and engaging engineering learning experience to young people during their education, it is hoped that ripples of long-lasting impact will support increased study and practice of engineering in the future. The journey through this competition experience is, therefore, designed to benefit learners, teachers and schools in a multitude of ways that can, cumulatively, support future generations of UK engineers.



2015 - 2016

2 regions joined and the 1st prototype was built



9,702 School Pupils



334 Teachers



153 Schools



228 Engineers



3 Regions



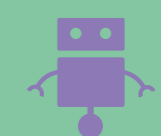
3 Awards Event



3 Exhibition



45 Winners



1 Prototype

The Leaders Award



The Leaders Award is made up of many elements that have been designed to enhance the learning experience of its participants, namely learners, teachers and engineers

The 'If you were an engineer, what would you do?' Leaders Award competition

Is the starting point of the award, where pupils aged 3 to 19 are invited to interview an engineer, find a problem and draw and annotate a solution to it. Learners also write a letter to an engineer explaining their design to accompany their annotated drawing. These designs and letters are then sent to Primary Engineer.

IF YOU WERE AN
ENGINEER
WHAT WOULD YOU DO?



Engineer Interviews:

Engineers are interviewed face to face, online or through the Primary Engineer YouTube Channel. Engineers are guided through the interview process, giving short presentations and reserving more time for questions from learners. A list of notable recorded interviews and online links are included at the end of this report.



Grading Days and Judging Panels:

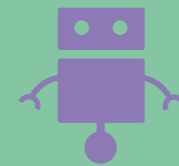
Engineers, engineering professionals and university engineering undergraduates and apprentices are invited to read and grade every competition entry. This enables every learner to receive a personalised certificate with a grade awarded by an engineering professional.

In 2023, across 25 locations in the UK, a judging panel was formed to select two of the best ideas from the shortlisted graded entries in each year group. Two additional entries per year group are often designated as "highly commended". The judges then agree on an overall winner to be presented on the evening as the "judges' favourite".



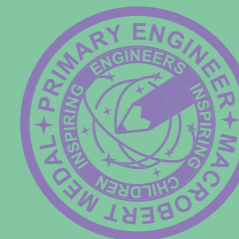
Exhibitions and Awards:

In each of the 25 locations across the UK, an exhibition featuring all shortlisted entries from the region takes place. Awards evenings invite winners, highly commended entrants and family and friends to congratulate these participants.



ProtoTeams:

Each year, university and industry partners choose one or more idea to prototype in each of the regions. These teams collaborate with the learner who designed the chosen entry as their "client" and engage them and their class in the prototyping process, sharing the ups and downs of the build. These prototypes are then unveiled the following year at the exhibition and awards events.



The Primary Engineer MacRobert Medal:

This prestigious medal recognises the innovation and public engagement of the ProtoTeams. Teams submit an application outlining the journey of the prototype from a drawing on a piece of paper to a physical working prototype. A judging panel of engineers awards gold, silver and bronze medals to the engineers and learners who created the original idea at a public event.



'If you were an engineer...' Podcast (series 1 - 3):

Interviews with engineers explore their backgrounds and journeys into engineering. Engineers talk about their time in school and experiences from their engineering careers. Learners also feature in the podcasts, sharing the problems they have used engineering to solve. Season special episodes include engineers at the Royal International Air Tattoo and the Primary Engineer MacRobert Medal Winners.



'If you were an engineer, what would you do?' Leaders Award Competition Book:

A published book of engineers' favourite entries, drawing on the first 10 years of the competition.

10 Years of Making a Ripple, 10 Years of 'If you were an engineer, what would you do?' Leaders Award Competition Report:

An impact report examining how the Leaders Award competition has supported learners, teachers and engineers in the UK.



2016 - 2017

A name change saw the Leaders Award take shape. School pupils Primary and Secondary were asked the question: "If you were an engineer what would you do?"

23,807
School Pupils



1,524
Teachers



348
Schools



331
Engineers



6
Regions



6
Awards Event & Exhibition



96
Winners



2
Prototypes



Evaluating the Leaders Award Competition

The following sections of this report explore the effectiveness and impact of the 'If you were an engineer, what would you do?' Leaders Award competition. This analysis is informed by both historic and new datasets to provide a rich overview of the competition and its benefits.

The Leaders Award competition has been previously evaluated in each of its 10 years of operation to examine its reach and impact. Over time, the methods adopted for these evaluations have changed in response to insights from previous evaluations, developments to the project and new research findings in engineering education literature. As the competition approached its tenth year of operation, additional efforts were made to explore the programme and its legacy of impact.

This included an enhanced end-of-year survey for the 2021/22 and 2022/23 academic years (with 150 teacher responses), a survey for engineers who have taken part in the competition (with 127 responses) and a survey for teachers who have historically taken part in the competition (with 79 teacher responses).

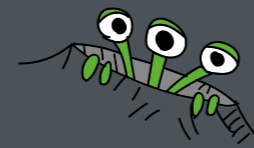
Additionally, a range of interviews with students, teachers and engineers were conducted to explore first-hand experiences with the Leaders Award competition. Previously submitted reports and testimonials from teachers were also drawn upon.

This broad dataset has been brought together and analysed in this report to examine the value of the Leaders Award competition as an engineering educational experience. It was not possible to apply statistical significance testing with collected survey data; however, emergent trends within this data were examined in relation to testimonial and interview findings to triangulate patterns of impact. The following findings are offered as a snapshot of the impact of the 'If you were an engineer, what would you do?' Leaders Award competition. It would be impossible to map every effect and ripple of impact produced by this large project, due to the hundreds of thousands of submissions over the last 10 years. However, the combination of historic data, new survey insights and broad reaching interviews can provide a rich overview of the ways this competition has benefitted learners, teachers and UK engineering.

First, the impact of the Leaders Award competition on learners is explored. This examination considers how learners are supported to develop a greater understanding of engineering, encouraging more positive attitudes towards engineering and aspirations for future engineering education or careers. The analysis also explores how learners can develop key engineering capabilities through their competition experience with engineering design.

Next, the impact of the competition on teachers and schools is considered. The ease with which schools can take part in this competition and its benefits on teacher confidence with engineering are explored. Wider benefits to teaching beyond the engineering learning context are also examined.

Finally, a reflection is drawn on the importance of providing learners with the opportunity to meet and engage with engineers. The benefits of this interaction for learners, teachers and engineers are examined. Case studies are also included throughout the remaining sections of this report. These 'Leaders Award Competition Stories' offer a range of deeper insights into the first-hand experiences of learners, teachers and engineers who engaged with the Leaders Award competition.



2017 - 2018

Grading days are introduced to help grade entries and live online engineer interviews are introduced.

37,739 School Pupils
 47% 53%

3,131 Teachers

560 Schools

1,393 Engineers

9 Regions

17 Online Interviews

8 Grading days

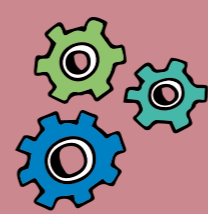
9 Awards Event & Exhibition

165 Winners

5 Prototypes



Impact for Learners



Since 2012, the 'If you were an engineer, what would you do?' Leaders Award competition has received 255,401 entries, which represent hundreds of thousands of engineering learning experiences taking place across the United Kingdom.

Taking part in the competition allows pupils to meet and learn from engineers, explore engineering in the world around them and develop their own engineering solution to a real-world problem. The Leaders Award competition has been carefully designed to fit the existing national curricula to support a wide array of learning outcomes. In this way, learners are provided with the opportunity to get involved with engineering, develop a greater understanding of its place in society but also support their curricular learning in school. The competition aims to show every participating learner that they have the potential to become an engineer in the future.

The benefits to learners who take part in this competition are explored below, drawing on over 10 years of evaluative data and interviews with learners, teachers and engineers. This analysis considers how learners develop a greater understanding and interest in engineering, key engineering thinking skills and aspirations for engineering careers, as well as the broader educational impacts because of their Leaders Award competition experience.

Understanding Engineering and its Importance

The UK faces notable challenges of low awareness and understanding of engineering among its younger generations. .

Figures published by EngineeringUK in 2020 found that 47% of 11- to 19-year-olds knew little or nothing about what engineers do,

with some learners found to possess limited definitions that framed engineering as difficult, complicated and dirty work¹. While some progress has been made in recent years, the challenge of poor engineering literacy remains a significant threat to the study and practice of engineering in the UK.

Several factors are likely to contribute to these poor levels of engineering literacy. Engineering is generally less present within the UK national curricula than other more highly prioritised subjects such as science or mathematics. As a result, learners may not have the opportunity to encounter engineering or develop a strong foundation of understanding that they can draw on as they progress through education and into careers. Young people are also unlikely to have access to a knowledgeable individual who can teach them about engineering; figures from the earlier referenced EngineeringUK report show that most teachers and parents report a limited understanding of engineering careers. With little offer of engineering learning in schools and few trusted sources to advance their understanding, it is unsurprising that many learners in the UK possess a limited conceptualisation of what engineering is and what engineers do.

¹EngineeringUK, 2020. Engineering UK 2020: Educational pathways into engineering.

The Leaders Award competition and wider Leaders Award programme are designed to address this challenge by supporting learners to develop a richer understanding of engineering and its place in the world around them. By engaging with engineers, reflecting on the role of engineering in society and critically undertaking their own engineering design activity, learners gain first-hand experiences from which to develop their engineering literacy. For many, this competition will be their first meaningful engineering experience. Evaluations reveal that the Leaders Award competition has a positive impact on engineering learning. Survey data reveals that

96% of teachers agree or strongly agree that their pupils now have a greater understanding of what engineering is and its importance following their experience with the programme.

Teacher testimonials support and elaborate on this statistic, highlighting the greater understanding of learners following their competition experience. One primary school teacher, who has taken part in the programme for more than five years, strongly recognises this benefit to engineering learning:

“ [The Leaders Award competition] certainly helped the pupils to talk about engineering with a level of understanding. They would be able to talk about it in a way that they knew what they were talking about, and they could perhaps give you examples of types of engineering jobs and where we would see [engineering] in the real world. ”

Another teacher highlights how the competition has supported learners to develop a rich understanding of the skills and activities that underpin engineering:

“ Pupils reflected on the skills they used to create their designs; maths skills, problem solving, drawing, imagination, thinking, creativity, phonics, writing and being able to try again when things do not work – resilience! They were also able to verbalise some of the future problems they would face in the development and making of their designs... highlighting the thinking process going on, which was more sophisticated than I thought it would be in a Primary 3/4 [age 6/7] classroom. The learning visible throughout this project was astounding. ”

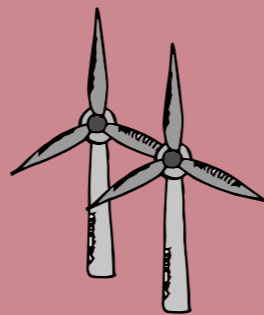
²Fogg Rogers, L., and Sanders, N., 2023, April. Close to home or communal goals? Socioeconomic status is correlated to engineering problem-finding and relevance. Presented at Public Communication of Science and Technology, Rotterdam

The value of the competition to engineering learning is also clear to engineers who support the competition. One engineer recalls a clear example of engineering learning in action:

“ One pupil asked a very pertinent question about why railway electrification wires always had to be above the train, why not underneath the train when necessary, to avoid having to demolish and rebuild road bridges over the railway. Some very smart thinking went into that question. ”

Findings such as these evidence that the Leaders Award competition is successful in its aim of advancing understanding of engineering within UK schools. Not only do these findings suggest that learners develop greater comprehension of what engineering is, but also show that they likewise develop greater understandings of its role within society. Past research, conducted by Fogg-Rogers and Sanders, examined 892 designs submitted to the Leaders Award competition. They confirmed that learners draw on problems from their everyday life and that, as a result, learners from different areas identified different problems for engineering to overcome². This framing of how engineering fits within society facilitates a robust and sophisticated understanding that is entrenched in the world around the learner. The engineering literacy developed through the Leaders Award competition stands in sharp contrast against the limited engineering literacy of young learners reported at the national level.

The competition therefore allows thousands of young people each year to advance their understanding of engineering in a meaningful way.



Enjoyment and Interest in Engineering

The Leaders Award competition also aims to provide learners with an enjoyable and memorable learning experience. While developing greater engineering literacy is critical, young learners are unlikely to sustain an interest in engineering if their learning experiences are not engaging and entertaining. Fostering a positive impression of engineering is therefore a crucial component of motivating future interest in engineering education or careers. Past research has shown that learners in the UK will often hold fewer positive attitudes towards engineering than towards other subjects such as science or mathematics^{3,4}. If more young people are to be encouraged to consider engineering careers, then these negative perceptions of engineering must be addressed.

Evaluations support that the Leaders Award competition is successful in providing a positive engineering learning experience. **Survey data shows that 96% of teachers believed that their pupils had enjoyed learning about engineering while taking part in the programme.** Further insights support that this enjoyment positively motivates learners, as

89% of teachers agreed or strongly agreed that their pupils were curious about engineering and 91% of teachers reported that their pupils were inspired to learn more about engineering and STEM following their competition experience.

Comments from teachers further highlight the interest and enjoyment nurtured by the Leaders Award competition. One teacher, Lisa, reflects that

“ Our children worked together to design a fantastic space robot to collect space junk and debris. The project stimulated the interest of all the children involved. ”

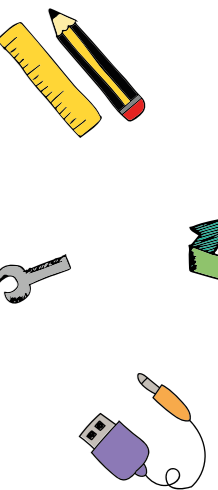
Another teacher, Kaylee, highlights the excitement for engineering that the competition can encourage:

“ We introduced the competition on a Friday and set a weekend homework task to gather some ideas. One student in my class came in on the following Monday with a poster tube full of rolled up designs, drawings, adverts and a letter! She was so excited! ”

Testimonials also support that the competition can foster a curiosity for engineering that teachers can then draw on in their wider teaching. Another teacher shares how

“ [My pupils] are more interested in hearing about links to engineering when looking at everyday life. They are talking more about ways they could create things that could be useful. There are more questions being asked. I have also found myself talking about engineering more often, in subtle ways, in class. I have been able to see links through some classwork that I wouldn't necessarily have thought of before. ”

These findings show that the Leaders Award competition experience is a positive one for learners. Engineering is presented in a way that is not only enjoyable but also motivates curiosity and an appetite for more. By providing these learners with a greater understanding and a positive view of engineering, the competition may drive individuals to engage further as they move through education and into their careers. As many competition submissions come from primary school-aged learners, this suggests that the competition may serve as an early intervention to support our supply of future engineers.



³ EngineeringUK, 2019. EngineeringUK: Engineering Brand Monitor 2019.

⁴ Hutchinson, J. & Bentley, K., 2011. STEM Subjects and Jobs: A longitudinal perspective of attitudes among Key Stage 3 students, 2008-2010.

Shaping Learners into Engineers in the Making™

The Leaders Award competition and wider Leaders Award programme also aim to support learners to actively participate with engineering and develop their engineering abilities. During their experience with the competition, learners are supported to adopt the role of Engineers in the Making™ and design their own engineering solution to a real-world problem. This engineering design experience gives learners the opportunity to nurture key engineering skills and proficiencies, as well as an entrepreneurial mindset, that they may not encounter elsewhere in their curriculum. In particular, the competition aims to instil learners with “**engineering habits of mind**”; wwho identify six key habits of mind that engineers possess and apply in their work. These habits of mind were adopted and interpreted in the specific context of the Leaders Award competition.

| LUCAS AND HANSON'S (2014) ENGINEERING HABITS OF MIND | HABIT OF MIND DESCRIPTION ADOPTED BY PRIMARY ENGINEER |
|--|---|
| Problem Finding | Testing and identifying problems, acknowledging areas of improvement, exploring opportunities for innovation. |
| Visualising | Imagining solutions, exploring ideas, planning and rehearsing actions. |
| Adapting | Trying new things, adapting to change, reflecting on own approaches to work. |
| Systems Thinking | Playing with ideas, fitting concepts together, building rich networks of understanding, acknowledging interconnectedness. |
| Improving | Experimenting, learning from mistakes, exploring other ways of thinking. |
| Creative Problem Solving | A vital process that lies at the heart of engineering practice, proposing and designing solutions, critiquing and re-examining solutions. |

If these habits of mind reflect the qualities that engineers draw on in their work, then it would be beneficial for learners to develop these capabilities through their Leaders Award competition experience. The development of this engineering mindset would support learners with a richer understanding of engineering and may show learners that they are capable of working as an engineer does.



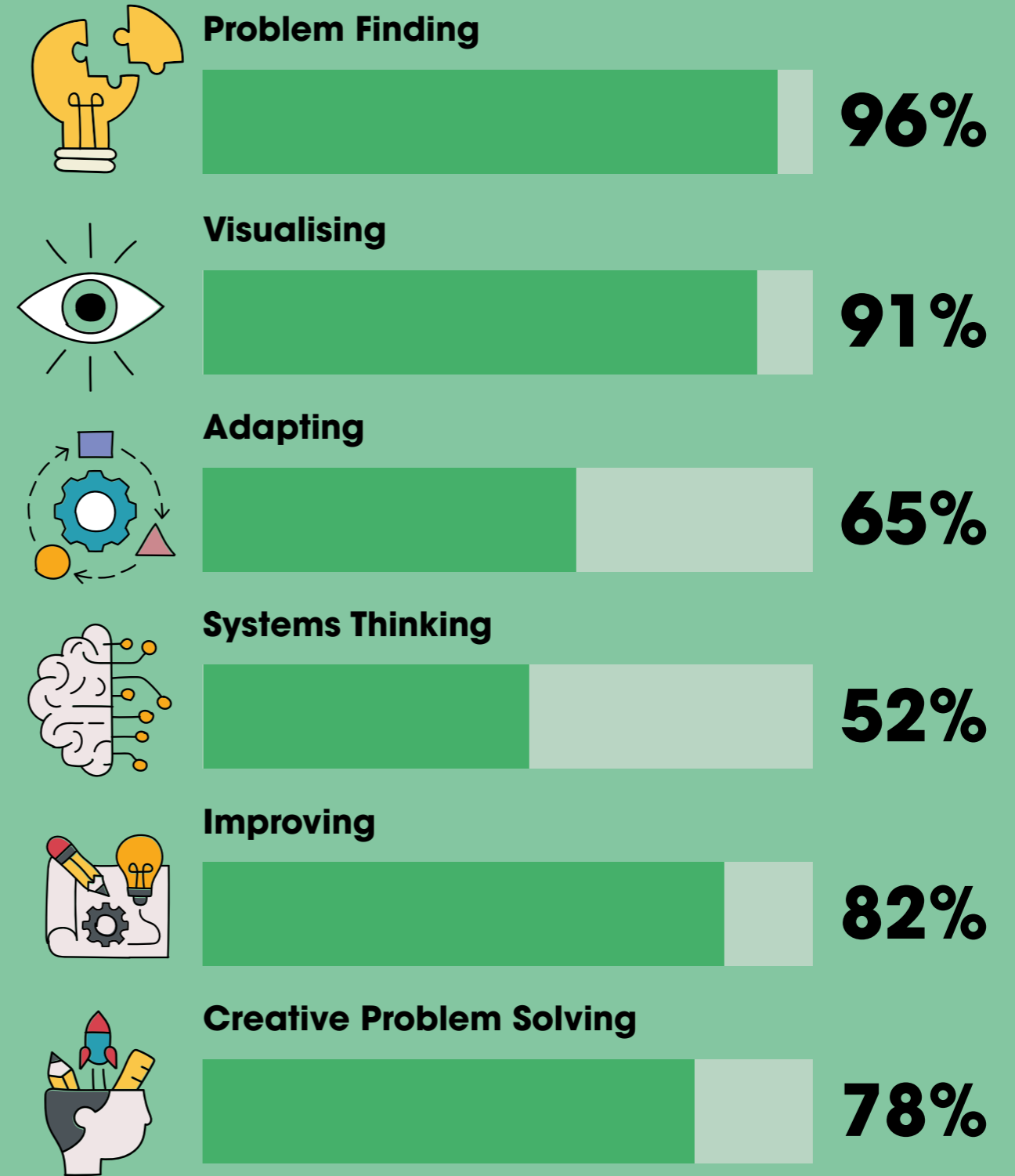
⁵ Lucas, B. & Hanson, J., 2014. Thinking like an engineer: using engineering habits of mind to redesign engineering education for global competitiveness.

Recent programme evaluations show that learners are successfully provided with the opportunity to develop these habits of mind.

In 2021/22 and 2022/23 teachers were asked whether they believed that the project had helped their pupils to successfully think like an engineer.

the results are outlined below.

Percentage of Teachers Reporting Successful Adoption of Habit of Mind by Learners



Engineering Habit of Mind

These findings support the idea that the competition provides learners with the opportunity to develop engineering capabilities. Some habits of mind are notably nurtured more than others through participation with the Leaders Award competition. **Problem Finding, Visualising, Improving and Creative Problem Solving** are successfully adopted more often than Adapting or Systems Thinking. This may be because of the competition task itself, where learners are asked to find a problem and adopt creative problem solving to either develop a novel solution or improve an existing one before visually outlining the design. The high rates of adoption of these four habits of mind indicate that the Leaders Award competition is successful in supporting learners to practise key engineering capabilities.

These findings offer a positive picture of the capacity for learners to develop as Engineers in the Making™ through their experience with the Leaders Award competition. Not only do pupils who take part in the programme learn about what engineering is and enjoy their learning experience, but they are also provided with the opportunity to develop thinking skills that are applied in engineering activities. These habits of mind can support learners to better understand the world of engineering and might also be drawn on in wider learning contexts in school.

For example, Visualising, Problem Finding or Systems Thinking may support learners in approaching mathematics problems, developing aesthetic design in Art, understanding natural systems in Geography or experimental processes in Science. By providing an opportunity to practise engineering habits of mind, the Leaders Award competition offers a beneficial learning experience that can support learners to develop useful expertise.

Engineers who have participated with the Leaders Award competition also recognise the way in which learners develop their skills while participating in the competition.

Survey findings show that 97% of engineers agreed or strongly agreed that the competition supported the development of essential engineering skills such as problem solving or creativity.

Teacher testimonies further evidence the benefit of the engineering habits of mind developed during the competition. One teacher notes,

“Even though my class are very young, we are working on and developing our engineering habits of mind and we talk everyday of how we can make things work and make things work better. We apply the concept of adapting and improving in many aspects of our learning and behaviours. It has been great to see how much more open the learners are to standing back and considering where problems may be and can be addressed, this may be in relation to writing tasks, maths, friendships and while working on our Primary Engineer project.”

These findings highlight the broad benefits on offer to learners and teachers through the Leaders Award experience.



Engineering Aspirations

The United Kingdom faces a longstanding engineering skills shortage that must be overcome if UK engineering is to operate at its full potential. Encouraging young learners to consider engineering career paths is an important step in solving this skill shortage and bolstering the future health of UK engineering.

Past research shows that there is room for improvement in the engineering aspirations of young people in the UK: data published in 2019 shows that 50% of learners would not consider a career in engineering³. Other publications have found even lower levels of aspiration for engineering among populations of young learners and that aspirations remain relatively consistent throughout teenage years⁶. It is therefore vital to nurture aspirations for engineering as early and as often as possible to generate a healthy supply of future engineers.

The Leaders Award competition aims to encourage engineering aspirations and support learners to see engineering as a fulfilling career through an enjoyable and informative annual engineering learning experience. Meeting an engineer, learning what engineers do and taking on the role of an engineer while designing a product are important aspects of the competition experience that might support a learner to aspire to become an engineer. Survey data reveals that the programme is successful in encouraging these engineering aspirations:

87% of teachers agreed or strongly agreed that the project had a positive impact on pupils' careers aspirations in engineering and STEM.

Evaluations also suggest that the competition can inspire a wide variety of learners to consider engineering. Issues of participation and representation within UK engineering are well known, with an underrepresentation of women and people from minority ethnic backgrounds. These challenges are present within populations of young learners in the UK, as Simon, one engineer who took part in the competition, reflects:

“One [interview question] that has stuck with me was from a young girl who asked, ‘Can girls be engineers?’ This just showed how much work is still needed to change the perception of engineers when an eight-year-old thinks it’s only for boys.”

Despite these ideas being present within the thinking of young learners in the UK, survey data indicates that the competition effectively addresses entrenched ideas that engineering is only for certain types of people:

87% of teachers agreed or strongly agreed that their pupils now feel that engineering is a career anyone can pursue following their competition experience.

³ EngineeringUK, 2019. EngineeringUK: Engineering Brand Monitor 2019.

⁶ Archer, L., Moote, J., MacLeod, E., Francis, B. & DeWitt, J., 2020. ASPIRES 2: Young people's science and career aspirations, age 10-19. London: UCL Institute of Education.



Given the wider challenges of diversity and participation in UK engineering, this finding evidences the value of the Leaders Award competition in supporting a robust and diverse supply of future engineers.

In 2023, half of the 48,052 entries were received from girls, highlighting the equality present within the reach and participation of the competition. Moreover, girls often receive more awards from this competition than boys, demonstrating the capacity of this project to support young girls to excel in engineering. The impact of the Leaders Award on engineering aspirations is clear in learner testimony. One student, who took part in the Leaders Award competition while in secondary school, recalls how inspirational it was:

“ It really, like, inspires you because through [the Leaders Award] we got to meet engineers, and talk to them, and just see people that look similar to you in aspirational roles. It just inspires you and lets you know it is possible to go down that route. ”

The positive effects of the competition on engineering aspirations are also indicated by teachers in their testimonials:

“ Having female engineers inspired the girls in my class to consider these jobs as possible careers, especially the space-related careers. STEM is so important and primary school-aged pupils are sponges ready to absorb what these engineers have to offer. ”

Another teacher, Rachael, highlights how taking part in the engineering design challenge invests learners in engineering:

“ Pupils enjoyed designing products that were going to ‘save the planet’. We had great ideas and many of my pupils felt their design was going to get made. Many are already planning to become engineers to be able to make their product. ”

Lisa, another teacher, illustrates how the competition can support learners to consider engineering pathways:

“ part in projects such as this is always useful in engaging pupils, talking about careers and also taking the time to make children aware of the wealth of employment paths and opportunities that are available to them. ”

The potential for the competition to support career aspirations is also recognised by engineers who meet learners during their engineer interviews. One engineer, Christina, notes that

“ The students I visited didn’t have many engineering role models and weren’t aware of the strong engineering industries in their own city. So it was really nice to help make them aware of the possibilities open to them! ”

These findings show that the Leaders Award competition can nurture engineering aspirations among young learners. Given the national challenge of the engineering skills shortage, this is a meaningful outcome. While it is impossible to track each individual that has submitted an entry into their future career, teacher testimonials anecdotally support that the competition has successfully nurtured future engineers. One teacher comments that

“ A few of the [participating] seniors have actually now gone to university and have actually done engineering degrees, which is really good! ”

It is possible that many engineers entering the UK workforce will have had their early aspirations supported by the Leaders Award competition.

Careers-Related Learning and Engineering

Another central aim of the Leaders Award competition is to support learners with a stronger knowledge of engineering careers. While developing aspirations is important, it is also vital that learners develop the insights necessary to realise these aspirations as they progress through their education. Recent research by EngineeringUK has found that less than 40% of learners know what they need to do to become an engineer and that fewer than half of STEM secondary school teachers and less than a third of parents would be comfortable giving engineering careers advice^{1,3}. If teachers are less comfortable talking about engineering careers, then it is possible that the career advice available to learners will instead focus on non-engineering career paths. The Leaders Award competition aims to address this and aid learners in advancing their understanding of engineering careers. By helping teachers contact engineering companies and organise opportunities for learners to meet and interview an engineer, the competition can provide direct learning experiences to support the careers knowledge of both teachers and learners.

Evaluations find that the programme is successful in addressing this challenge. Survey data shows that

81% of teachers agreed or strongly agreed that the programme was of value to the careers-related learning within their school.

This indicates that the competition is successful in supporting most schools and teachers who may not have previously had access to direct sources of engineering careers knowledge.

Interview and survey data further support this conclusion with testimonials from teachers. One teacher comments that

“ The online interviews were very informative and allowed us to discuss careers in more meaningful ways. They were also hugely inspiring and encouraged girls especially to realise that there are many female engineers and it is a career path for all. ”

A further teacher, Jenni, highlights the impact of meeting an engineer:

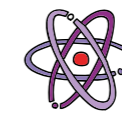
“ was really valuable for the children to meet an engineer... and be able to find out what the job might mean and some of the skills involved. It was a great way to launch our project and hook the children in. ”

These findings show how the Leaders Award competition can support careers learning in participating schools. Taking part in the competition can provide learners with insights into engineering careers and support teachers to develop their knowledge through contact with engineers. The competition may also support schools to meet statutory guidelines for careers advice such as the Gatsby Benchmarks⁷. These are encouraging outcomes for the Leaders Award competition that indicate learners will be better prepared with knowledge they can draw on as they navigate their path towards employment.

¹EngineeringUK, 2020. Engineering UK 2020: Educational pathways into engineering.

³EngineeringUK, 2019. EngineeringUK: Engineering Brand Monitor 2019.

⁷Gatsby Charitable Foundation, 2018. Good Career Guidance: Reaching the Gatsby Benchmarks.



Wider Benefits to Learning

While the Leaders Award competition is, at its core, an engineering learning experience, its activities have also been designed to support a wide variety of skills. For example, learners will draw on literacy skills in writing their persuasive letter to engineers and annotating how their proposed solution will function, art and mathematical skills in illustrating their design, and design and technology skills in considering materials and the structure of their proposed products. These wider learning outcomes are supported through curriculum-mapping of competition activities to the national curricula of the UK. This mapping is designed not only to encourage wider learning outcomes but also ease the integration of the competition into existing school activities.

Evaluations suggest the programme does offer wider benefits to learning beyond the engineering context. Survey data shows that **79% of teachers agreed or strongly agreed that the programme had a positive impact on student learning in a general manner. Further insights from the survey show that 88% of teachers believed that the programme was effective at developing pupil knowledge and skills in Engineering; with 89% also recognising effective development in Design and Technology/Technologies; 74% in Science; 63% in English/Literature; and 58% in Art/Design.**

The ability of the competition to draw on learning from other subjects is also highlighted by Tessa, an engineer:

“ I was asked a question by a young pupil about how electricity in a cable moves and doesn’t escape. I was so impressed - this question is central to what electrical engineers (and even computer and materials engineers) do, and what the challenges we face are... It was such an insightful question and showed the pupil was inquisitive and had physics on their mind! ”

These findings highlight that learning outcomes from the Leaders Award competition do indeed extend beyond the engineering domain to benefit learning more broadly. This is a significant outcome from the competition that highlights its value to learners and schools. Even if a learner is not persuaded by their competition experience to consider engineering in the future, their academic studies can still benefit in other ways.

These benefits extend beyond subject area learning to also include classroom behaviours that support a positive learning environment. For example,

92% of teachers agreed or strongly agreed that their learners were focused when taking part in the competition while 72% agreed or strongly agree that their learners worked well with others and 53% agreed or strongly agreed that their learners communicated more effectively in the classroom.

The benefit of this programme on enthusing pupils about learning is also highlighted in teacher testimonials:

“ If you were an engineer, what would you do?’ has been a great resource to use as a platform to shape and broaden children’s knowledge of engineering. Pupils were enthusiastic and excited to part take in the project. ”

These positive characteristics of enthusiasm and excitement may endure to support learning in other subject areas beyond the competition experience.

The positive impacts reported here may be linked to the novel way of learning introduced to classrooms by the Leaders Award competition. It is unlikely that pupils will have previously encountered a programme such as this involving a regional competition, a new subject area to learn about, and the introduction of visiting experts into the classroom. Participation with the competition inherently challenges that status quo of classroom practices and provides young people with the opportunity to approach learning in a different way.

The benefits of this for learners who might not flourish in traditional learning contexts are clear. One teacher, Hannah, writes,

“ Children who academically struggle were able to shine, take part as one of the team and showed more pride in themselves and better self-confidence after the experience. ”

This point is echoed by a further teacher who comments that

“ The Leaders Award benefits the whole group of children who aren’t so good at filling in worksheets, I think because it takes that pressure away from having right answers and wrong answers. It gives them that freedom to draw and the freedom to express themselves in a different way other than literacy and numeracy... So, I think it does allow those children to express themselves and to do well and to succeed in places where they don’t normally succeed in school. ”

The value of the competition to teaching and learning for Special Educational Needs and Disabilities (SEND) pupils is also recognised by teachers. One teacher, Susan, notes how

“ A selection of pupils with SEND needs that often struggle with English and Maths did very well in the competition – some even gained merits or distinctions! Their ability to ‘think differently’ supported the way they accessed and developed ideas. ”

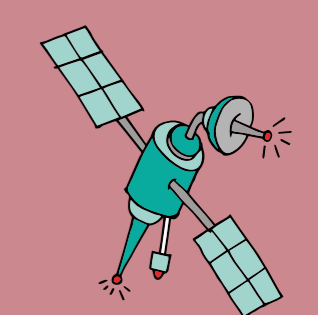
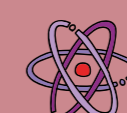
The potential for the competition to support success among learners who may not be expected to flourish is recognised by Adam, an engineer who supported the competition:

What stands out for me is one girl who I was told might struggle (she was at least a year behind with reading, writing and maths) but she totally got it. Her diagram was understandable, she’d come up with a real problem and worked out a genuine solution. I was talking to the teacher at the end of the day, and she was amazed at what I was saying. It just showed that sometimes a different, practical approach can really get through to people who struggle more academically.

These findings highlight the wider value of the Leaders Award competition for schools and learners. Pupils who take part in the competition are not only offered the opportunity to learn about engineering but also to practise skills from other subject areas. The novel approach to learning used in this competition can also provide learners who are not typically recognised as academic to flourish. All learners, including those who are less typically recognised for their academic ability, will have their work graded by an engineer and be awarded a certificate marking their achievement. Evaluations show that the benefit of these positive experiences endures:

87% of teachers who responded to one survey examining the historic effects of the competition recalled a lasting impact of the competition on their learners.

Evidence from teacher testimonials and anecdotal feedback collected over the last 10 years suggest this recognition and boost in confidence is an impact that cannot be underestimated.



2018 - 2019

49,169
School Pupils



3,631
Teachers



672
Schools



1,345
Engineers



16
Regions



37
Online Interviews



16
Grading days



16
Awards Event & Exhibition



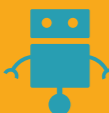
2,822
Designs were shortlisted



283
Winners



11
Prototypes



Leaders Award Competition Stories: Learners

Heather Pinder, University Student

Heather is currently a university student but took part in the Leaders Award competition while in secondary school. Her design – a rubbish bin that crushed its own contents to minimise space in landfill – was distinction shortlisted and later turned into a working prototype by a ProtoTeam. Heather shares her reflections on the Leaders Award competition and the impact it had on her as she progressed through her education.

“ I loved [the competition]. It was a way to be creative and come up with a real-life solution and make it realistic. It was kind of different from anything else I had done before because it is very easy to come up with these impossible inventions and that sort of thing, but in your head trying to make it realistic and trying to come up with a sort of engineering way of bringing your idea to life was really interesting. And I really enjoyed it ”

Despite it being several years since participating in the Leaders Award, Heather still recalls how it felt to have her work acknowledged by an engineer.

“ I remember my school had a winner in my year. So, one of my friends won, and then I think I got a ‘highly commended’. I was really proud because I had put quite a lot of work into it! I was quite invested. So to get an almost, like, a commendation from an actual engineer - from someone who thinks that [the design] would actually be able to be made and actually is doable - is actually something to be really proud of I think. I was really happy. ”

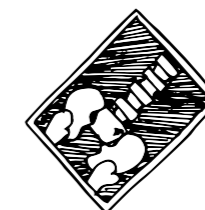
As a distinction shortlisted entry, Heather’s rubbish-compacting bin design was displayed at an exhibition alongside other entries. Heather recounts visiting the exhibition event and how it felt to see her work on display.

“ I took my mum and dad, they both came. It was great. I loved it. It was such a proud achievement to see it exhibited there and that someone had thought it was good enough to exhibit it, if that makes sense? It wasn’t unbelievable, but it was something to be really proud of, I think.

... [The exhibition] really added to it because it made you actually have that bit of accomplishment: ‘Oh that’s me on a wall! That’s what I did!’ So it was good to go and see it. I think it did really add to [the competition experience]. The certificate and everything was great but actually getting to go and see it was the cherry on top. ”

The certificate and accomplishment of her Leaders Award experience continued to support Heather as a notable achievement as she progressed towards higher education.

“ [My certificate] is on my LinkedIn... And I mentioned it in my university application. I wasn’t applying just to engineering as such, but it added to [the application]. It was something to show, an extracurricular sign of initiative ”



Heather currently studies medicine and shares that she has always wanted to be a doctor but shares how, despite this, the Leaders Award competition did draw her interest towards an engineering career.

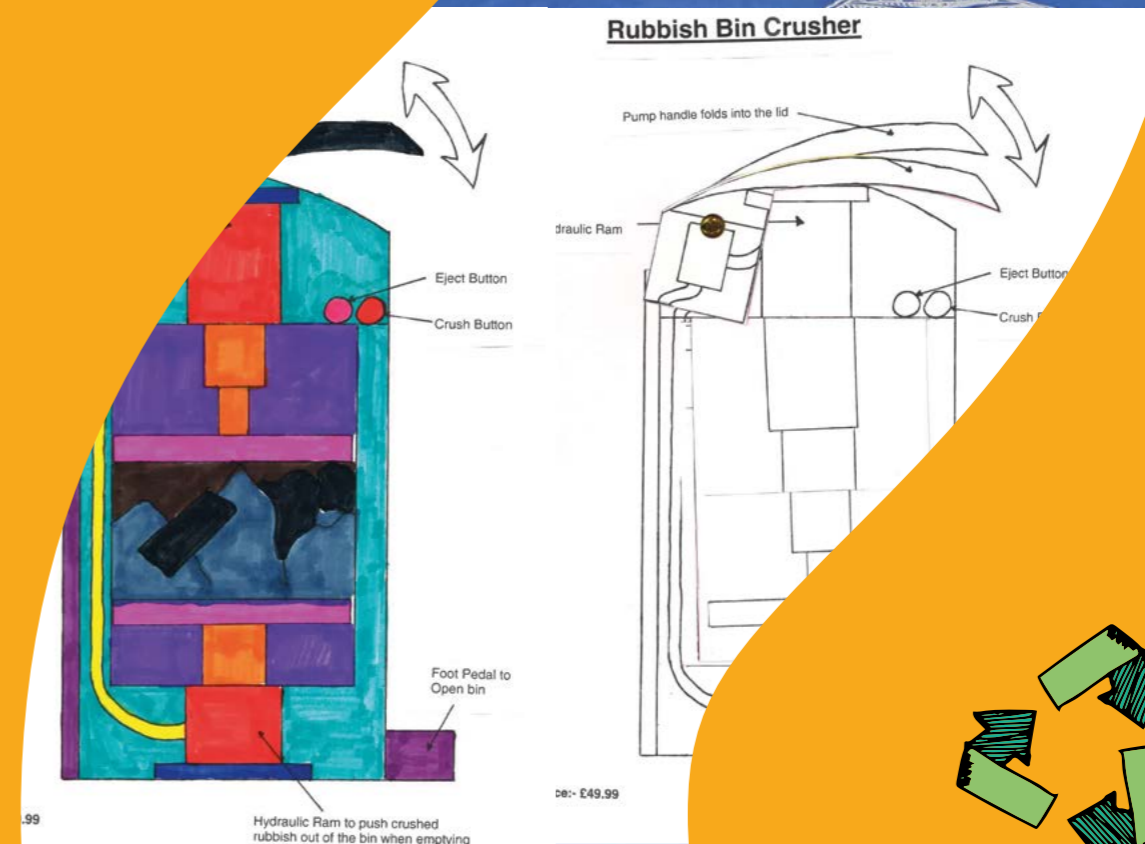
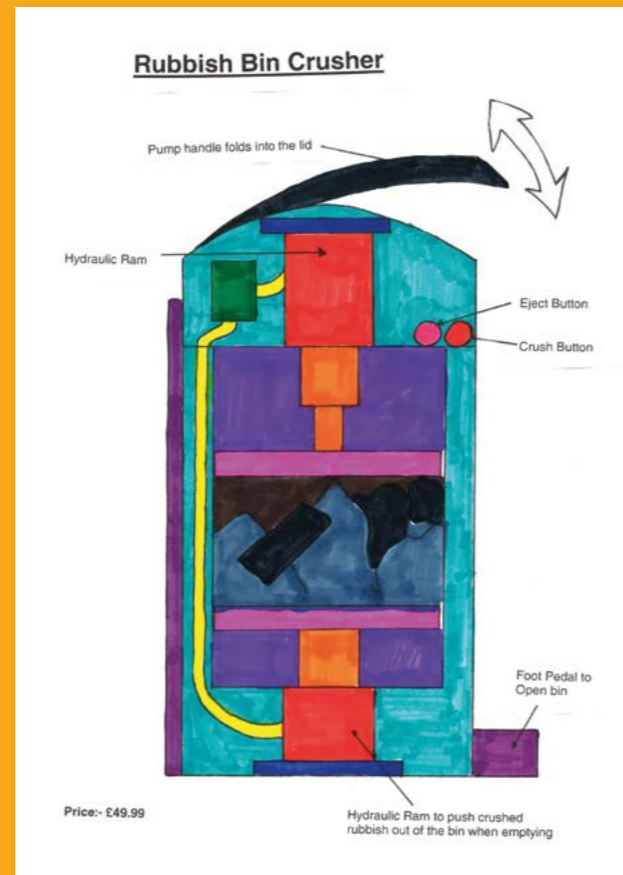
“ I think [the competition] made me really consider doing engineering as a degree. It pushed me more towards the engineering-side, I would say. And then getting to do the prototype as well gave me a bit more insight into what actual engineering students do and how they work. So in the end I did apply for engineering as well as medicine; I applied for biomedical engineering. But I think it did give me a confidence boost. It did show me that [engineering] is something I could be involved in. ”



‘Rubbish Bn Crusher’
Heather, Age 13 (2017)
Queens Margeret Academy, Scotland

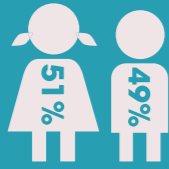
My family’s large green dustbin is collected by the bin men every two weeks and because there is so much wrapping on food and other items, we have difficulty fitting all of our rubbish into the green bin even though we do our best to recycle as much as we can. Larger families on our street have difficulty fitting their rubbish into the bins and I often see bin bags resting on top of their green bins on bin day. The bin I have designed will crush the rubbish in the inside bin so that more rubbish can then be put in the green bin outside. This will also be good for the environment as it will mean less room will be needed at the landfill site for the same amount of rubbish to go into. Also, because the rubbish is crushed, it will require less space in the bin lorry so it will not have to make as many trips to the tip to empty when on its rounds. This will mean that it will use less diesel and be more environmentally friendly.

The bin works by using the pump handle to pump the hydraulic ram down on top of the rubbish to crush it. This will be done as few times as the bin fills up. Because the rubbish is crushed, the bin would be difficult to empty. So, to empty it, the pump handle would be used to pump the hydraulic ram at the bottom to push the rubbish up and out of the bin.



2019 - 2020

30,210
School Pupils



317
Teachers



305
Schools



486
Engineers



19
Regions



58
Online Interviews



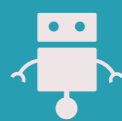
466
Engineers digitally
graded



22
Virtual Awards
& Exhibition



15
Prototypes



*some statistics are missing or affected due to the pandemic

Impact for Teachers and Schools and Schools



Over the past decade, thousands of teachers from thousands of schools have participated in the Leaders Award competition. In 2023 alone, 2,932 teachers took part and delivered the competition in 602 schools across the UK. While the Leaders Award competition is a learner-centred project, it is important to recognise that teachers and schools can also benefit from their competition experience.

By taking part in this competition, teachers are enabled to advance their own understanding of engineering, bring new approaches to STEM teaching and learning into their classroom and develop enduring regional networks with engineers and local companies. In this way, the Leaders Award competition can act as a means of teachers' CPD while supporting schools to bring engineering into their curriculum through an exciting project.

In the following section of this report, the benefits to teachers and schools who take part in this programme are explored by drawing on 10 years of evaluative data and interviews with teachers. This analysis examines the ease of introducing the competition into a school, growth in teacher confidence with teaching engineering and wider benefits to teachers and schools that stem from the Leaders Award experience.

Ease of Taking Part in the Leaders Award competition

Heavy workloads and prescriptive national curricula can leave schools and teachers with little opportunity to organise activities outside of compulsory curricular teaching. To support schools and ease participation, the Leaders Award competition has been carefully designed to minimise the effort schools need to make to get involved. This has been achieved through supportive resources to aid teachers in delivering lessons on engineering and curriculum mapping to align the engineering design activity with existing curriculum lesson content.

Survey data shows that these efforts are largely successful in supporting schools to take part in the competition. Data shows that

71% of teachers agreed or strongly agreed that the competition is easy to integrate into the curriculum.

Not only does this finding validate the curriculum-mapping of the competition, but it also serves to demonstrate that engineering learning can be compatible with classroom learning despite the limited presence of engineering in UK national curricula.



While supported by Primary Engineer, teachers who take part in the competition are responsible for organising their own interview with an engineer. Approaching experts to support school activities can often be a novel experience for teachers. Survey data shows that

73% of teachers agreed or strongly agreed that they were more confident in contacting and engaging engineers to support classroom learning following their competition experience.

This finding demonstrates how teachers can develop soft skills that can support their teaching practice through engaging with the Leaders Award competition.

The development of these skills is also clear from teacher testimonials. One teacher, Siobhan shares:

“I have never organised people to come in and talk to pupils at an assembly before. This really had a big impact on my confidence with approaching members of industry and inviting them along. It also helped me build confidence speaking at assemblies.”
- Siobhan, (Teacher)

Findings such as these show that the Leaders Award competition can challenge some teachers to develop new skills that may enrich their teaching practice. Once a teacher has been guided through the process of contacting an expert, they will likely be able to do the same independently in the future. In this way, the novel teaching and learning approach developed during the Leaders Award competition can leave teachers with a set of skills that can positively impact future teaching.

Further findings suggest that teachers view this growth as a positive experience and something to pursue further. Survey data shows that

77% of teachers agreed or strongly agreed that they are more willing to take part in CPD for engineering teaching following the competition.

¹³ EngineeringUK, 2019. EngineeringUK Engineering Brand Monitor 2019.

The Leaders Award competition does not only provide training on how to teach engineering but also leaves many teachers with a growth mindset and eagerness to learn more. This is a promising finding that may further indicate lasting benefits to teachers who engage with the competition.

Benefits to the Teaching of Engineering

Past research shows that many teachers in the UK have a low level of confidence in their ability to approach the subject of engineering with learners. Findings published by EngineeringUK show that only 30% of STEM secondary school teachers surveyed knew “quite a lot” or “a lot” about what engineers do. In addition to this, only 45% of teachers are confident giving careers advice about engineering; these figures are lower than those for the confidence felt in giving careers advice for other areas such as science or technology¹³. It is reasonable to expect that confidence among teachers who do not specialise in STEM, including primary school teachers, will be lower still than these reported figures. The low level of engineering confidence among teachers is perhaps unsurprising; engineering is not typically a central aspect of teacher training due to the limited presence of the subject within national curricula. Other subjects, such as Science or Mathematics, will often feature more heavily in teacher training programmes.

The Leaders Award competition offers teachers the opportunity to learn more about engineering through their contact with an engineer and via the detailed learning resources. Taking part in the competition can serve as a supportive framework for teachers to explore how to approach engineering learning within the classroom. Statistics show that teachers are successful in supporting learners to see the value of engineering:

98% of teachers agreed or strongly agreed that their learners viewed understanding engineering as important following the competition.



Teachers who take part in the competition also personally develop greater confidence with the subject:

79% of teachers agreed or strongly agreed that they were now more confident answering questions about engineering and 83% of teachers agreed or strongly agreed that they are now more comfortable talking to students about engineering careers.

This last figure is particularly important given the previously published findings.

The benefits of the competition on teachers are also clear in testimonials. One teacher, Katrina, notes,

“[The Leaders Award competition] helped me gain confidence in teaching more STEM and to think outside of the box when planning my lessons to children at all stages of the school.”

Another teacher, Joanne, recognises how the introduction of the competition can prompt a fresh perspective on teaching practice:

“[The competition] is interesting, it makes you reflect on the purpose of teaching STEM subjects and making the purpose evident to the children. Finding out a bit more about engineering each year has been great.”

These findings demonstrate how effectively the Leaders Award competition can support teachers to develop their professional skills with engineering. This greater confidence in bringing engineering into the classroom will likely endure and offer a legacy of benefit to engineering learning in future years, highlighting the broad value of the competition and its lasting benefits.

Wider Benefits to Teaching

Evaluations of the Leaders Award competition also highlight benefits to teaching practices beyond the subject area of engineering. Survey data shows that

65% of teachers agreed or strongly agreed that participating in the programme built their confidence as a teacher and that 82% of teachers agreed or strongly agreed that the programme was of value to STEM teaching generally within their classrooms.

These findings demonstrate moderate benefits to teacher confidence beyond the engineering context. The benefit to STEM subject learning is expanded upon further:

83% of teachers agreed or strongly agreed that they were now more confident with the subject of Engineering in the classroom, 59% with Science and 68% with Design and Technology.

The broader benefits of this project to teaching are also recognised in teacher testimonials. One teacher, Sandra, notes that

“I have to say that this project is fantastic and very good for children to be involved in. It has helped me so much in my STEM teaching.”

Another teacher comments:

“As science lead, this competition always allows me to promote STEM subjects in school. This is a valuable addition to the curriculum and impressed OFSTED (which is always a positive!).”

While some survey responses are more positive than others, these findings do demonstrate that more than half of teachers who take part in the Leaders Award competition are able to enhance their knowledge of non-engineering subjects through their competition experience.

Taking part in the Leaders Award competition also benefited wider teaching practices within the school beyond the engineering context.

“Where we could add value to the topic work that children were already doing, we would try and link an engineer’s specialism with that. So, for example, our Primary 3s [ages 6–7] would do a topic on food and farming. In the past we would invite a farmer in, which was great, but we had a few links with agricultural engineers who came in. And a side benefit of that was that the way we taught food and farming changed because staff were much more aware of the technological possibility and what was actually happening on real farms, and not just what we think of as farming from sixty or a hundred years ago – we were actually teaching something quite old fashioned. Suddenly they are talking about tractors with GPS and robotic milking parlours, and the children were more excited about it and the possibilities of it and the creativity. So [the competition] hit a lot of areas – we were not just doing it for the sake of it, we were not doing it because it was a competition, we were doing it because it was enriching our learners’ experiences. The competition part was a bonus: it gave us a structure to follow.”



These benefits also extend beyond the classroom. Jenn notes that participating with the Leaders Award has provided benefits for the wider school community including parents.

“[The pupil’s] whole world just gets a little bit wider, just a little bit bigger, which has been fantastic. And I think not just in terms of raising science and STEM capital with our learners but also our learners’ families too. Because they would talk about their experiences. We sent edited CVs from an engineer home with [the learners] for them to come up with interview questions, and they were having conversations with adults at home. Sometimes adults would ask a question through their child! Because they are interested in what engineers do or trying to catch the engineer out! So the competition involved the school community, not just the children and teachers, which I think was fantastic. It made such a difference.”

The Leaders Award competition allowed inclusive learning in Jenn’s experience, benefiting those with Special Educational Needs.

“I did find that our children – particularly children with dyslexia – came into their own with this competition. Because the focus was on the creativity. Certainly, the illustration had to be labelled but it was not huge amounts of writing. When we did our letters, this became a bit trickier but two of our learners who have won the competition had dyslexia...”

It felt really inclusive from that perspective, particularly where we have had classes who might have had children who were very able in the same class as children who are still learning. We can still include all students at their own ability within their class and represent their learning – it was really helpful. We didn’t feel like we couldn’t include every child, which is so important.”

Jenn believes that the competition has had a positive impact on the engineering learning of pupils and supports understanding of what engineering is and what engineers do.

“It certainly helped the pupils to talk about engineering with a level of understanding. They would be able to talk about it in a way that they knew what they were talking about, and they could perhaps give you examples of types of engineering jobs and where we would see [engineering] in the real world. They could definitely do that... We do engineering tasks throughout the school: craft and design activities, textiles activities... [the Leaders Award] aligned really well with everything else we were doing. If we were to say to a child ‘Would you like to be an engineer when you are older?’ whether they said yes or no they would be able to explain why. Whereas before they probably wouldn’t be able to tell us what engineers do.”

Jenn goes on to explain how meeting a real-life engineer plays such an important role in shaping these realistic understandings of engineering.

“We had someone who worked in renewables, and he spoke to the class, it was his day off so he was wearing jeans and a t-shirt and you could see his tattoos. And the kids were mesmerised! Because someone who is an engineer can also wear jeans! And have tattoos! They hadn’t thought that these [engineers] were real people. They talk about the engineer’s hobbies, or pets they have, or ‘yeah, I was great at football at school’ – it’s the normalisation of it, that they too could grow up and be like that person. That’s what made a really big difference to a lot of our learners – [the engineers] are accessible. If and when [the pupils] were to cross paths with an engineer in a professional capacity, you might never have those sorts of conversations normally – they’re focused on their work. And the pupils felt it was safe to ask them questions.”

Jenn shares one particularly strong memory of the Leaders Award competition, highlighting the incredible impact the competition can have on a learner who may not have otherwise been recognised as a high achiever.

“One of our winners had quite severe dyslexia, and academically never had the opportunity to really shine. There are children who work so hard, always work heart and soul, but never quite get the concept or it is slightly missed despite that they worked so hard or cared so much. Because of this... the family and school had focused on other skills... because we always look for the positives to support our children. And then when they came up with their winning idea – which was genius – they got this opportunity to go to a university building, with their entire family, to celebrate an achievement that I don’t think people might have guessed they were capable of. But [the Leaders Award] gave the pupil a chance to surprise everybody in a good way.

And the boost to the child’s self-esteem was unbelievable! They stood that little bit taller, they were a bit more confident and they would smile. I think they were a bit embarrassed by the attention, but it was probably the first moment where – in terms of their academic career – where they had attained exactly what we were looking for and more. And I think the minute anybody knows that they can achieve something then that’s it! There’s no stopping them! I think that was amazing to me. Amazing.”



2021 - 2022

33,430

School Pupils



1,233

Teachers



346

Schools



594

Engineers



19

Regions



32

Online Interviews



16

Grading days



16

Awards Event & Exhibition



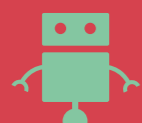
342

Winners



12

Prototypes



Series 2

Podcast



6

Primary Engineer MacRobert Medals



The Importance and Impact of Engaging with Engineers

The Importance and Impact of Engaging with Engineers

One of the defining characteristics of the Leaders Award competition is the way in which it supports learners to meet and interact with engineers. This contact is designed to provide learners with realistic and first-hand experiences that shape more informed understandings of what engineering is and who engineers are.

While the majority of this contact takes place during the engineer interviews organised by schools, it is also supported through the grading of learner submissions by engineers, the awarding of certificates based on these grades and the presence of engineers at regional exhibition and award events. Social links with professionals are acknowledged as an influential resource that can provide learners with key insights to support their career aspirations⁸. The Leaders Award competition seeks to provide more learners with this beneficial experience to encourage the engineering aspirations of a wider array of individuals.

Ease of Accessing an Engineer Interview

Teachers are supported to organise their own class or school interview with an engineer to foster greater understanding of engineering and its breadth of practices. Survey data shows that this is an accessible experience, with

93% of teachers agreeing or strongly agreeing that it is easy to organise their engineer interviews and 85% of teachers also agreeing that it was simple to involve their class with the interview.

These findings highlight the ease with which teachers can draw on the insights of experts to support their teaching. Furthermore, teacher testimonials highlight how receptive learners are to these social experiences. One teacher, Samantha, notes how

“The children thoroughly enjoyed finding out about the different career paths in engineering, this prompted thinking about possibilities and what if scenarios.”

Findings such as these evidence the ease with which schools can draw on expert engineering insights, through their experience with the Leaders Award competition, to the benefit of their learners.



⁸ Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B., 2015. “Science Capital”: A Conceptual, Methodological, and Empirical Argument for Extending Bourdieusian Notions of Capital Beyond the Arts. *Journal of Research in Science Teaching*, 52(7), pp.922-948.

The Value of the Leaders Award Approach

Evaluations also demonstrate the value of Primary Engineer's approach to engineering learning through first-hand experiences with engineers. Survey findings emphasise that teachers view this competition and its contact with engineers as relatively distinctive with

91% of teachers recognising the uniqueness of the competition and its contents.

Teacher testimonials demonstrate the value of this approach and its novel and accessible form of engineering learning. In particular, the value of social learning experiences with engineers is clear. One teacher, Linda, shares how

“Our engineer visited the school. He watched the children's presentations of their designs and explanations. [He] ... gave great feedback after each presentation. He was supportive and very patient.”

Some schools and engineers agree to multiple visits to maximise the contact between learners and engineers. One teacher, Kristen, recalls:

“We had two school assemblies with the engineer, and she then did class visits. Pupils loved interviewing her.”

Findings such as these highlight the positive experiences and value offered to learners through meeting an engineer and engaging in a novel way of learning.

The value of this experience is also clear to students who have taken part in the competition. One young person who entered the Leaders Award competition at age 14 recalls how

“We had like a speed dating event to help us through the competition, to help us see what kind of project we wanted to get involved in. So we got to meet a few different engineers and talk with them... So it was quite nice to meet real engineers, because it can be quite conceptual. It was ... nice to meet them and just ask them questions about anything – no matter how ridiculous we thought they were!”

Further findings also highlight that the values that underpin this approach to engineering learning are compatible with the views of engineering industries. Survey data collected from engineers who had previously participated in the Leaders Award competition show that

96% of engineers agreed or strongly agreed that the competition was aligned to the values of their engineering companies.

This figure shows that the approach taken to engineering learning in the Leaders Award competition is responsive to the perspectives of engineering industries and their understanding of engineering skills supply. Not only may this compatibility encourage the participation of engineers in the competition, it also suggests that the values which have shaped the contents of this competition are aligned with industry-led efforts orchestrated to support future generations of UK engineers. In this way, this statistic suggests that the Leaders Award competition is aligned with the objectives of the industry and supportive of its objectives.

Testimonials from engineers also highlight the value of Primary Engineer's approach to supporting future engineers through the Leaders Award competition. Mark, an engineer who has been involved with the competition for several years, shared why his team chose to work with Primary Engineer:

“We wanted to work in partnership with a company that was listening to us as an organisation but also challenging, and not bookmarking and putting children into pigeonholes. A lot of the companies we dealt with at the time said ‘it has to be this way and we want mechanical engineers’. And we thought: this isn't broad enough. What we need to do is start to inspire children to use their imagination and continue to use their imagination to address challenges.”

Mark also recognises the importance of developing imagination and providing learners with accurate insights into the world of engineering:

“But what's really important is that we inspire these young people to consider engineering as an option. And the problem, or the challenge, is at least from the educational system is actually engineering is not spoken about so easily as a career and how broad it is. When the dinosaurs ruled the planet and I was at school, you were an engineer if you were a car mechanic. It was grease, nuts and bolts. Today, it is a little more along the lines of electrification, electromechanical and software. But, actually, what you can do with that, the impacts on the planet, the world and the economy are massive. And we need people to come on this – not just a technical journey but – imagination journey.”

Findings such as these support the view that the approach to engineering learning adopted within the Leaders Award competition is a valuable and distinctive one that is responsive to the views of engineering industry and can support learners to develop richer understandings of the world of engineering.

Benefits to Engineers

As highlighted throughout this report, meeting an engineer and undertaking an engineering design project within the Leaders Award experience is widely beneficial for learners and teachers. But it is also possible to consider the benefits offered to engineers who take part in this competition process. For many engineers, meeting young learners, engaging in engineering learning experiences and grading or judging the engineering designs of learners are novel experiences

Survey evaluations show that the Leaders Award competition can provide engineers with an experience that inspires a greater sense of the importance of supporting future generations of engineers. Data shows that

49% of engineers surveyed reported that they already recognised such work as important, but 50% developed a greater sense of importance for this work following their competition experience.

These experiences leave engineers in support of the approach taken by Primary Engineer in providing early and engineer-focused experiences for learners; further findings show that

100% of engineers agreed or strongly agreed that early experiences with engineering and with real engineers were deeply important for the future and diversity of engineering.

Testimonials from engineers also highlight the ways in which participating in the Leaders Award competition can surprise them and demonstrate the potential of young learners as future engineers. As one engineer notes,

“I was once totally stumped by a brilliant question; how much does a plane weigh? My first instinct was to guess but then I became very aware of this generation's access to smartphones and Google, so I commented on how good a question that was and warbled my way around an answer (nearly 70 tons fully loaded A320 – I'll never be caught with that one again).”

The capacity for learners to surprise engineers is highlighted in other testimonials, with one engineer echoing that

“The levels of inventiveness were astonishing at times. From submarines that scooped up pollution, to hats that helped Alzheimer's sufferers. A favourite was a proposal to recycle old car tyres into materials for repairing worn out road surfaces.”

These findings show support for the approach to engineering education adopted by the Leaders Award competition and the ways in which participating with this approach can encourage engineers to develop a stronger interest in nurturing future generations of engineers.

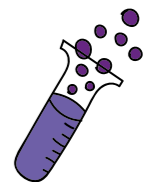
These experiences are also notably enjoyable for engineers, with testimonials demonstrating the positivity and validation offered to engineers who take part in the Leaders Award competition. One engineer shares how

“All my experiences have been memorable! I just love doing the interviews and answering the barrage of questions that follows.”

“I found the whole journey very rewarding, being in conversation with the school children was brilliant, with so many awkward questions to answer! Like, ‘How much do you earn?’ All the designs were great in their own way, with the technical knowledge of such young children being mind-blowing. I would really enjoy being involved again and would highly recommend to others to get onboard.”

- Andrew (Engineer)

These findings, collectively, illustrate the positive and impactful experience offered to engineers who participate with the Leaders Award competition. While many engineers who volunteer to support the competition already acknowledge the importance of supporting future engineers, many develop an even greater sense of value towards these efforts through their experience. Survey responses and testimonials collectively demonstrate that engineers find the Leaders Award to be a positive and rewarding experience that aligns to the values of their companies.



2022 - 2023

48,052
School Pupils



2,932
Teachers



602
Schools



831
Engineers



25
Regions



34
Online Interviews



16
Grading days



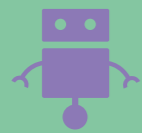
25
Awards Event & Exhibition



392
Winners



16
Prototypes



14
Primary Engineer
Macrobert Medals



Leaders Award Competition Stories: Engineers

Ciara McGrath, Engineer

Ciara McGrath is a Lecturer in Aerospace Systems at the University of Manchester. She teaches the next generation of engineers, particularly on the topic of space mission design, but is also an active researcher and works in outreach to inspire young learners to consider engineering pathways. It was in this outreach capacity that Ciara came to participate with the Leaders Award competition.

“ I got involved [with the competition] last year. I took part in one of the interviews which was so fantastic. Kids ask the best questions. They really put me on the spot. Things that you don't expect to be asked. They were brilliant and full of such good ideas. So I got involved first by doing that interview, and then I went on to help with the judging. I was involved in the Greater Manchester area judging and that was so much fun. It was just brilliant – a highlight of my year – to see all these incredible inventions that the kids had come up with. And so many of them were all about helping other people, or helping the environment, and I just thought it was brilliant to see what the future holds if those are our future engineers. Then I got to go along to the awards ceremony in Rochdale and hand out some of the awards alongside the mayor, which was really lovely. To meet all the kids was really fun. And finally, then I also went down to the Royal International Air Tattoo with Primary Engineer and was involved in The Inspire Stage show there which was incredible. So I was up right after the Red Arrows, which was a tough act to follow! But it was such a fun event and by some miracle we managed to time it so I finished just before planes started flying overhead, so it worked out alright in the end! ”

For Ciara, the grading events where engineers review and mark the submitted entries were a particularly powerful moment that stands out in her memory of the competition.

“ I always come back to the fact that it was really that first grading day – so the interviews and the questions were fantastic; it was great to get that engagement with the kids. But oftentimes in my role I go into schools and I give talks, or we do this sort of thing. And often that's the end of it; we don't get to see what comes next. So being able to go into that judging panel and see the designs – to me, that was just amazing. Because you could see how the kids had taken inspiration from the engineers that they had heard from, and that they had channelled that into something that none of us would have thought of. And I think that was brilliant to see how they could take that little spark of inspiration and turn it into something that was so, so brilliant.

The one that stuck with me of all the designs that I saw, and I'm sure that everyone has a favourite, was a design that was supposed to be a coat for people who were maybe living without a home. And this coat had solar panels on it so that during the day it could charge up, and at night it could keep someone warm. And I thought that was so simple, but it is actually so clever. And it would really solve so many problems. For someone to think of others in that way and take something that they had seen – solar panel technology – and put it into something that could be really useful, I just thought it was absolutely brilliant. And I came away from that, and it will always stick in my mind... that was the moment where I thought our future is in good hands. As long as we don't lose these young people. We need them to go on to be the engineers of the future because they have such good ideas. ”

Ciara shares that the quality and creativity of the entries submitted by learners across the United Kingdom brought its own challenge for the engineers working to grade the submissions – but that it was a pleasant experience to see all the designs that learners had developed.

“It is really hard because so many of them were such clever ideas. And as you can imagine with 10 engineers around the table, everyone has a different opinion, and we were all excited by different things. So it was very tough to pick the winners in the end. I think the things for me that jumped out – I think when people think about engineering, they think about the idea of maths and maybe they think of hammers and hardhats. Or they may think about technology, like electrical engineering and how we build phones and circuit boards. And I think some people were looking for the high-tech solutions where people had crammed in as many gadgets as possible...”

For me, I think actually what makes an engineer is – yes, those elements are important, we can't get away from that – but I think it is that creativity and communication that really makes a good engineer. The ability to think a little bit differently about a problem and come up with a solution. And to communicate that to someone else. It is no good if you have an idea but you can't make it a reality. So, I think the things that I was looking for were actually things that were simple, that I could understand exactly what the idea was and how that could be made into a reality. But also, something where they had looked at the world in a completely new way: taking things we already had or technologies that were already available and putting them together to create something completely new. I was looking for things that surprised me. Those were the things I enjoyed the most – things that I had never thought of before – that really surprised me and put a smile on my face.”

Ciara discusses the Leaders Award competition as a particularly strong engineering learning programme that engages a broad range of individuals thanks to its hands-on nature and pupil-focused approach.

“I have to say I have been involved with a lot of different initiatives in my time as an engineer and as a student as well in terms of going out and talking to kids about engineering and trying to inspire them. And the reason that I think that Primary Engineer and the ‘If you were an engineer’ competition is so good is that it reaches so many students from a variety of different backgrounds. Oftentimes, if you are giving talks at a science fair, for example, you are already getting students who are coming with their parents who have that background or have that interest. So first it's that it reaches such diverse groups of students.

And the second thing is that it gives them an opportunity to actually participate, put an idea forward, and try being an engineer for a day. And I think again a lot of the times, if we give a talk, it might spark with somebody, but if people feel like ‘I'm not sure if that's for me’ or ‘I'm not sure I would be good at that’, they might walk away and lose that interest. But by pushing these kids to actually have a go at something, I think a lot of them will discover that they are really good at this! That they do have this creativity and engineering mindset. And maybe that doesn't look like what they expected it to look like based on what we see in the media and around what engineering is. I think that is so important.

And bringing those two bits together: engineering even today in the UK is so underrepresented by women, in terms of ethnic minorities, in terms of people from LGBTQ community. We are missing a whole group of people, particularly in leadership and the higher levels of engineering. And at the end of the day, engineers are the people who design the technologies and the world that we are going to live in in the future. And that world has to be for absolutely everyone. So we need engineers from all of these different backgrounds to come up with ideas to help them based on where they come from and based on their experiences. And to me Primary Engineer gives such a good pathway from all of those backgrounds to really have a go and maybe discover something that they would have never thought of as a path for them otherwise.”

A key part of the Leaders Award competition is introducing young learners to the real world of engineering. Ciara explains that giving young people a strong understanding of engineering is of paramount importance.

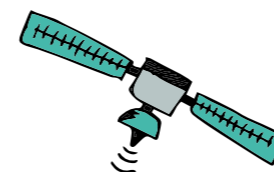
“I really think it is so important to give people a proper idea of what engineering is from a young age. Because otherwise, a) we'll lose those people who could have been incredible engineers just because they didn't know that is something they could do, and b) even the ones who think ‘I am good at maths, I am good at science, I like technology,’ – a lot of them might end going on to be scientists or mathematicians. And there's nothing wrong with that! But within the UK we are really short on engineers, and especially we see this in the research community; in universities, there are lots of people looking to do scientific research, which is so important, but we are missing those engineers who are going to dream big and create those future technologies. So, we need to rebalance the scales a little bit, I think. And let people know that if you're good at maths and science there is another path. And if you have those big ideas and that creative mindset maybe engineering is the place for you.”

Ciara has been an active supporter of outreach work that can encourage young learners to consider future engineering pathways, but Primary Engineer's Leaders Award competition stood out by giving learners the opportunity to explore engineering for themselves.

“When I got involved with Primary Engineer there were a couple of things about that first interview that I really loved. I think the main thing that I loved actually was that it was all about the kids – it was driven by the kids. So the presentation was about five minutes, and trying to cram some semblance of what you do into five minutes was really tricky but was a fun challenge. But a lot of these [outreach] kind of events that you are invited to, you talk for twenty minutes and maybe get one or two questions at the end. Whereas [the Leaders Award] was the complete opposite. It was me giving a five-minute taster and then the whole conversation was driven by the questions from the kids. And so, a) it really challenged me to think outside the box, and b) it was brilliant to see what they were excited about and interested in and be able to answer those questions.

To me, that was really different to what a lot of other schemes I have been involved with offered – and I loved that about it. But it was really getting involved in the judging that was a turning point. Because then I saw how much of an impact it was having on these kids, and how much their thinking had changed just through those interactions. I think that was really, really brilliant. And I have been hooked!

I think the other thing that was really nice to see was that pathway as well. And I have always said how important it is to inspire the next generation because we need that diversity. But [the Leaders Award competition] was like a microcosm of that. In such a small space of time, you actually got to see a diverse group of students all of whom have the potential to be engineers and the ideas that they came up with, with that spark, which was just brilliant. So suddenly you can see that pathway, and you can see if we don't encourage and support these people, you could see what we were at risk of losing. So that really hammered it home for me, how important these things are. And it's not just about me getting up and talking about myself, it is about really making a two-way conversation and giving kids the opportunity to try things out and get involved. For me, that's why it was so different and why I loved being involved.”



Ciara highlights the significance of the Leaders Award events, particularly for supporting a greater diversity in the next generation of engineers.

“I think [the awards event] did have a sense of gravitas – of how important it was. The really nice thing to see, and I hope it will stick with some of them, was the diversity of winners from all different backgrounds, different genders, different ages. All this variety all in that one room. And it's very different from what you might see at an engineering awards ceremony in a company, for example. So, I hope that sticks with the pupils. That they can look around and see that there were other people in the room that looked like them, that came from the same school or place as they came from. And that these could be their engineering colleagues in the future. So, for me that was the really nice thing to see, and I hope there is a spark of that buried in the back of their heads as well.”

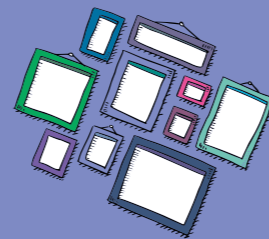
Finally, Ciara shares why it is important for her personally to be involved with the Leaders Award competition and how getting involved can make you feel like you are making a difference.

“I think for me the really nice thing is to feel like you are actually making a difference. So often you put things out there, and you have no idea whether someone might pick it up or might not pick it up. Or if it is really hitting home. With the Leaders Award you were able to see the engagement from the kids, with all the questions, you were able to see the designs and the excitement on the awards night. And you can see the whole journey. So, it really felt like an opportunity to make a difference.

That's not something that comes around very often, actually. So often we get stuck in our day to day lives of doing the same things over and over again. And the idea of being able to give that sense of excitement to someone was really wonderful. And I think it is also the fact that I wish it was something that I could have had when I was a kid. Until I was a teenager and applying to university, I had never considered the idea of becoming an engineer. But I wish there had been something like this when I was a kid to get me inspired and give me an opportunity to be creative and try it out because it would have actually made a big difference to me. So I am hoping it can make the same big difference to someone else.”



Report Conclusions



For the past 10 years, Primary Engineer’s ‘If you were an engineer, what would you do?’ Leaders Award competition has supported engineering learning across the United Kingdom, receiving over a quarter of a million entries and engaging thousands of learners, teachers and schools. This report has explored the ways in which the Leaders Award competition has impacted those who both participate in and support the project and looked at how successful it has been in supporting the development of our next generation of engineers.

Impacts for Learners, Teachers and Engineers

This report has found that the competition is successful in its aim to provide learners and teachers with a greater understanding of engineering, its breadth of practice and the roles of engineers. Learners who engage with the Leaders Award competition are found to acquire stronger understandings of engineering and its practices, while also advancing their engineering competencies and wider learning skills and developing stronger aspirations to participate in engineering in the future.

The analysis has also confirmed the value of the Leaders Award competition to teachers who participate in the project. Teachers find that the competition is a positive and valuable learning experience that is easy to participate in. Many also report the development of greater confidence for teaching engineering, as well as wider benefits to their teaching practices.

Engineers who support the Leaders Award competition are also found to benefit from the experience, developing stronger views on the importance of supporting future engineers while receiving positive and fulfilling experiences that align with the values of their companies. The competition provides engineers with the opportunity to experience the creativity and innovation offered by the ideas of young people. These findings also validate the underlying philosophy of the Leaders Award competition and its framing of engineers as creative problem solvers who make a difference in wider society.

The designs produced by Leaders Award entrants demonstrate the social-mindedness and innovation present within the thinking of learners. This approach challenges restrictive definitions of engineering or engineers by highlighting the importance of creativity and the potential for all learners to develop into thoughtful and innovative Engineers in the Making™.

Long Term Impacts to Support UK Engineering

It is impossible to track the career trajectory of each learner involved in the Leaders Award competition to determine whether they have progressed into an engineering role. However, as this report outlines, learners do develop stronger understanding of engineering careers and more positive engineering aspirations through their Leaders Award experience. These findings align with the competition’s objective to encourage learners to see engineering as a creative force for change within society and to be aware that there are a diverse set of roles and career pathways that offer people the opportunity to solve problems through creativity, innovation and entrepreneurship. The report findings suggest that the competition supports greater diversity in engineering aspiration through its “whole class approach” that allows a broad range of learners to experience engineering and develop an understanding that engineering is a career pathway that is open to anyone. Anecdotal evidence from teachers also indicates that several learners who have taken part in the project have gone on to become engineers, suggesting a positive link is present between early experiences with engineering through the competition and eventual access to engineering careers.

The Leaders Award competition has been designed to support substantial, cumulative change over time to build greater support for UK engineering. The competition comprises multiple components (interviews, design activities, persuasive writing, events) with multiple points of contact between learners and engineers. It is hoped that the positive impact of these experiences accumulate into “ripples of change” that have a profound impact over time and across the UK. A learner who has taken part in the project is likely to develop a stronger understanding of engineering, which may prompt them to consider engineering educational pathways as they get older. A teacher who has engaged with the competition will often develop greater confidence with teaching engineering which may help them to introduce more engineering throughout their curriculum teaching for years to come.

The 'If you were an engineer, what would you do?' competition continues to grow and evolve. This curriculum mapped, whole class competition has allowed learners aged 3 to 19 to gain insights into the creativity and the enormous possibilities available to them through engineering. By bringing engineers into the classroom and allowing many young people to learn about the industry and profession by asking the questions that matter to them, we have created an immersive environment that is perfect for inspiring the next generation of engineers. This also allows a diverse range of engineers from all backgrounds and disciplines to act as role models to these learners, often then seeing their names listed as one of the engineers who inspired the thousands of incredible ideas submitted to the competition.

Looking forward, we will aim to increase the number of older learners participating in the competition, and we will look to encourage more industry partners – not only universities – to participate in the challenge of forming ProtoTeams and prototyping learners' ideas. This will not only increase the number of submissions and the level of innovation for the Primary Engineer MacRobert Medal but also allow us to share more stories of the design processes and, importantly, ensure that learners are made aware that only by doing things wrong will they get them right, thus teaching resilience and creativity in all their forms.

Evaluation, insights and case studies will continue to be central to the impact reporting we provide to our supporters and to the stories we share publicly. We will continue to prove the value and impact on learners who experience the creativity and the art of problem finding and solving as they discover the true worth of engineering to the society we all aspire to live in. Primary Engineer will continue to offer this impactful engineering learning experience to schools across the UK. This will see the continuing development of the Leaders Award competition, building on its reach and providing the benefits identified in this report to a wider array of individuals. Efforts will also be made to build on the longer-term tracking of participants to determine the far-reaching impact of the Leaders Award competition experience. Primary Engineer will seek to build greater engagement with engineers to further enrich the learning experiences offered to schools through engineer interviews and to provide more engineers with a fulfilling experience supporting the grading and judging of entries. These findings will be published in case studies and reports such as this one, as well as in a book outlining the creativity and innovation of learner competition entries.

The next 10 years will see more engagement with learners across all age groups, from early years through to college level and across all learning establishments, which will require more engineers to give time to being interviewed and to grading those entries. For teachers, there will be more opportunities to extend their own knowledge of engineering and its place across the curriculum through the new courses and qualifications we will be developing.

This report has shown the success of the 'If you were an engineer, what would you do?' Leaders Award competition over the last 10 years, and the coming decade promises to be an exciting opportunity to further support the engineering industry in the UK.

If learners do only one thing in school that is related to engineering, then this must be it! joined us on this journey so far for your continued support.

Susan Scurlock MBE
CEO and Founder Primary Engineer

Looking Forward Making More Than a Ripple



References

1. EngineeringUK, 2020. Engineering UK 2020: Educational pathways into engineering. [pdf]. Available online.
2. Fogg-Rogers, L., and Sanders, N., 2023, April. Close to home or communal goals? Socioeconomic status is correlated to engineering problem-finding and relevance. Presented at Public Communication of Science and Technology, Rotterdam.
3. EngineeringUK, 2019. EngineeringUK: Engineering Brand Monitor 2019. [pdf]. Available online.
4. Hutchinson, J. & Bentley, K., 2011. STEM Subjects and Jobs: A longitudinal perspective of attitudes among Key Stage 3 students, 2008-2010. [pdf]. Available online.
5. Lucas, B. & Hanson, J., 2014. Thinking like an engineer: using engineering habits of mind to redesign engineering education for global competitiveness. [pdf]. Available online.
6. Archer, L., Moote, J., MacLeod, E., Francis, B. & DeWitt, J., 2020. ASPIRES 2: Young people's science and career aspirations, age 10-19. London: UCL Institute of Education.
7. Gatsby Charitable Foundation, 2018. Good Career Guidance: Reaching the Gatsby Benchmarks. [pdf]. Available online.
8. Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B., (2015.) "Science Capital": A Conceptual, Methodological, and Empirical Argument for Extending Bourdieusian Notions of Capital Beyond the Arts. Journal of Research in Science Teaching, 52(7), pp.922-948.

Appendix A: Supporters of the 'If you were an engineer, what would you do?' Leaders Award Competition



Appendix A: Supporters of the ‘If you were an engineer, what would you do?’ Leaders Award Competition

2H OFF SHORE • 3D ENGINEERING • 4 SQUARE ENGINEERING CONSULTANCY LIMITED • 4C DESIGN • 6020 MARINE LTD • A-L MECHANICAL LTD • A&L MECHANICAL ENGINEERING • A9 DUALLING • AAL • ABB MOTION • ABBOTT RISK CONSULTANT • ABENGOA • ACCORD • ACE REFRIDGERATION • ACE WINCHES • ACG AUTOMOTIVE • ACS • ACTION FOR CHILDREN • AD SPRINKLER PROTECTION LTD • ADIENT • ADLEK • ADS • ADTI • ADVANCED FORMING RESEARCH CENTRE • AE GLOBAL • AECOM • AECOMAFFINITY • AEG PROJECT SOLUTIONS LTD • AGGREKO • AGILIST • AIR PRODUCTS • AIR TRAFFIC CONTROL • AIRBUS HELICOPTERS UK LTD • AISIN WORLD CORP AMERICA • AKER SOLUTIONS • ALBA OIL • ALBATERN • ALDERCOTE • ALEXANDER DENNIS LTD • ALLCOOPER • ALLIED VEHICLES • ANGLIA RUSKIN UNIVERSITY • ALPHA MANUFACTURING • ALSTOMBILFINGER • AMAZON • AMEC FOSTER WHEELER • AMEC OIL & GAS • AMEY • AMEY RAIL • AMPHION • AMPS ASSOCIATION • ANDERSON ENGINEERING • ANDIBEE LTD • ANGLIO EASTERN GROU • ANGUS & DUNDEE COLLEGE • ANGUS COLLEGE • ANGUS COUNCIL • ANSTRUTHER PRIMARY SCHOOL • ANSYS • ANUR ROBOT • APD LTD. • APPLE • AQUAFLOW BIONOMIC CORPORATION • AQUATERA • AQUEUM LTD • ARAMIS • ARC ENGINEERING • ARC PRO DESIGN SOLUTIONS LTD • ARCCARNOLD CLARK • ARCH HENDERSON LLP • ARDAGH GLASS • ARQUIVA & IHC • ARRK EUROPE LTD • ARTEMIS • ARUP • ASHER ASSOCIATES • ASSYSTEM UK • ASTRAZENECA • ATKINS • ATKINS OIL & GAS • ATLANTIS RESOURCES LTD • ATLAS CLOUD • ATOS • AUDI • AUDI AUTOGAS GERMANY • AUGMENTUM • AUTO SOFTRONICS • AVANI • AVID TECHNOLOGY • AVON RUBBER • AWE • AXON GABLE • AYRSHIRE COLLEGE • AYRSHIRE MEMORIALS • AYRSHIRE ROADS ALLIANCE • B.A.M. • B.P. • B9 ENERGY • BA MAINTENANCE • BABCOCK AVIATION • BABCOCK MARINE • BABCOCK RAIL • BAPTIE GROUP • BAPTIE SHAW & MORTON • BAE SYSTEMS • BAKER HUGHES • BALFOUR BEATTY • BAM NUTTALL CONSTRUCTION • BAM RITCHIES • BANK OF SCOTLAND • BARNSMUIR FARM • BARNSTROUD • BARR CONSTRUCTION • BARRATT • BAS SYSTEMS • BASF-USA • BBC • BBV • BCM FARIVA • BCW ENGINEERING LTD • BDP • BEAR SCOTLAND • BEARING PRO TOOLS • BELBIN • BERESFORD HOUSE • BHC LTD • BHGE • BIBBY OFFSHORE • BIFAB • BIGNALL GROUP • BIO ARTS INTERNATIONAL • BITALINO DEVELOPERS • BLABY DISTRICT COUNCIL • BLACK AND VEATCH LTD • BLACKBERRY • BLADE HOME • BLAIRS • BLAXTON ENGINEERING • BLOODHOUND PROJECT • BLUEWATER • BLYTH & BLYTH • BMW • BOART EUROPE • BOEING • BOLTON UNIVERSITY • BOMBARDIER • BOOTH WELSH • BOOTS • BOSCH • BOSE ELECTRONICS • BOULTING GROUP • BP • BP SHIPPING • BRIDGECAT, GAIST SOLUTIONS LTD • BRIDGES ENGINEERING • BRISTOL ROBOTICS LABORATORY • BRISTOL UNIVERSITY • BRISTOL WATER • BRITISH AEROSPACE • BRITISH AIRWAYS • BRITISH ARMY • BRITISH COMPRESSED AIR SOCIETY • BRITISH GAS • BRITISH HEART FOUNDATION • BRITISH PETROLEUM • BROADCOM • BRUKER • BSD FOREVER • BT • BURNLEY BOROUGH COUNCIL • BUREAU VERITAS UK • BURGER KING • BURO HAPPOLD ENGINEERING • BUSINESS MICROS • BUSINESS STREAM • BUXTON DESIGNS • BVC • CADBURY • CAF • CAIRNHILL STRUCTURES • CALDER BUSINESS MANAGEMENT CONSULTANT LTD • CALEDONIAN PAPER MILL • CALIFORNIA STATE UNIVERSITY • CALMAC • CALMAC FERRIES • CAMBRIDGE DESIGN PARTNERSHIP • CAMBRIDGE UNIVERSITY • CAMLIN • CANTERBURY CHRIST CHURCH UNIVERSITY • CAN OFFSHORE • CANTILEVER LTD • CAPITA • CAR • CARDIFF METROPOLITAN UNIVERSITY • CARDAN PRECISION ENGINEERING • CARELYN LTD • CARILLION CONSTRUCTION SERVICES • CASLET • CASTLE PRECISION ENGINEERS • CAT • CATAB CONSULTING LTD • CATERPILLAR • CATHODIC PROTECTION • CAVENDISH NUCLEAR • CBC • CBOC FAWLEY • CDE ENVIRO LTD. • CEGB • CENTRE OF SPACE ENGINEERING • CENTRICA ENERGY, EXPLORATION & PRODUCTION • CENTRICA ENGINEERING • CFG ASSOCIATES • CH2M • CHANEL • CHARLES HURST • CHARLIE SMITH DESIGNS • CHAS • CHEMRING ENERGETICS UK • CHEVROM UPSTREAM EUROPE • CHEVRON • CHEVRON ENERGY TECHNOLOGY COMPANY • CHILDREN'S UNIVERSITY • CHIVAS • CIENA • CIGNA • CIRCATRON PRECISION ELECTRONICS • CIRRUS • CIRRUS & CYBERHAWK • CISCO • CITB-CONSTRUCTION SKILLS • CITY ENERGY SOLUTIONS • CITY OF GLASGOW COLLEGE • CITY UNIVERSITY OF LONDON • CIVIL AVIATION AUTHORITY • CL DESIGN SOLUTIONS • CLANCY CONSULTING • CLANSMAN DYNAMICS • CLASSONE EQUIPMENT CLYDE BERGEMANN • CLC FACILITIES • CLEARWATER FPC LTD • CLEVELAND BRIDGE & ENGINEERING COMPANY • CLOCH SOLICITORS • CLOUDREACH • CLYDE BERGEMANN LTD • CLYDE MARINE TRAINING • CLYDE PORPOISES • CLYDE SPACE • CLYDE TRAINING SOLUTION • CLYDEPORT CONOCOPHILLIPS (UK) LTD • CMG HEATING • CNOCLLEE • CNOOC INTERNATIONAL • COCHLEAR • CODE CLUB • COGENT • COGNIZANT • COLAS • COLLEGE DEVELOPMENT NETWORK • COLLINS AEROSPACE • COMHAIRLE NAN EILEANSIAR • COMPUTER XPLOERS • CONCEPT BUILDING SERVICES • CONGNIZANT • CONISBEE • CONOCOPHILLIPS (UK) LTD • CONSOLIDATED CONTROL CORP • CONTUR SERVICES LTD • COOLFORCE • COOPER SOFTWARE • CORNELL UNIVERSITY • CORNETTO • CORWALL MECHANICAL • CARS • COSBAIN • COSMO PLANETARIUM • COSTAIN LTD • COTY • COUGAR AUTOMATION • COVENTRY UNIVERSITY • CPX RESEARCH • CRANFIELD UNIVERSITY • CR SMITH • CRAMLINGTON FORGE • CRANFIELD AVIATION TRAIN SCHOOL • CRASH COURSE KIDS • CSC INDIA • CUMBRIA CLOCK COMPANY • CUMMINS • CUNDALL • CURTINS • CUTECIRCUIT • CYBERHAWK • D.O.V • D&G ELECTRICS • D&G STRUCTURAL ENGINEERS • D&P PLUMBING • DAIMER AG • DALKEITH ELECTRICAL • DALZIEL SERVICES • DATATECHNICAL • DATED TECHNOLOGIES LIMITED • DAVID BROWN SANTASALO • DAVID RITCHIE (IMPLEMENTS) LTD • DAVIES GROUP • DEFENCE, SCIENCE AND TECHNOLOGY LABAROTORY (DSTL) • DEFENCE EQUIPMENT & SUPPORT (DE&S) • DEKA • DELL • DELOITTE • DELONEX • DELPHI TECHNOLOGIES • DENMAN • DENSO • DEPARTMENT FOR EDUCATION FORT VALE • DEPARTMENT FOR INTERNATIONAL TRADE • DEPARTMENT OF EARTH, SCIENCE & ENGINEERING - IMPERIAL COLLEGE • DEVELOPMENT ENGINEERING COMPANY LTD • DEVLIN CONSULTANTS • DEVOL ENGINEERING • DFID • DI-SPARK • DIAGEO • DIAGIO DISTILLERY • DIAMOND CONCRETE DRILLERS • DIEBOLD NIXDORF • DIESEL LINE • DIGITAL FORENSICS • DIODES INC • DIRECTOR OF HIGHWAYS • DISCOVERY CHANNEL • DLS DENTAL • DOCOBO • DON AND LOW • DOOSAN BABCOCK • DOUGALL BAILLIE • DOUNREAY • DPL • DPS SERVICES • DR PETER HUGHES OBE • DRAEGER • DRAX • DRIVES AND AUTOMATIONS LTD • DSM • DSM/AVIATION • DSM/ROCHE • DSSR CONSULTING ENGINEERS • DSTL • DUBAI ENGINEERING COMPANY • DULAS • DUMFRIES & GALLOWAY COUNCIL • DUNDAS CONSULTANTS LTD • DUNDEE AND ANGUS COLLEGE • DUNDEE CITY COUNCIL • DUNDEE UNIVERSITY • DUNGENESS POWER STATION • DUPONT • DURHAM UNIVERSITY • DUSTACCO ENGINEERING • DYNOCHEM • DYSON • DXC TECHNOLOGY • E & B • E.S.E. • E&I ENGINEERING • EA TECHNOLOGY • EAC • EAGLE DESIGNS • EASIER STUDENT INC. • EAST ANGLIA UNIVERSITY • EAST AYRSHIRE COUNCIL • EAST DUNBARTONSHIRE COUNCIL • EAST NEUK CAMPERVANS • EATING STONES • EATON • EDF ENERGY • EDGE HILL UNIVERSITY • EDISON GENERAL • EDRINGTON • EDT SCOTLAND • EDWARDS VACUUM • EE • EEF • EGGER • EKO TUNE • ELECTRIC DRIVES TECHNOLOGY LTD • ELECTRIC POWER RESEARCH • ELECTRICAL ENGINEER • ELECTROPAINT LTD • ELLIS & MOORE • ELRING KLINGER • ELSTREE AERODROME • ELVID UK • EMC • EMEAR RESEARCH • EMERGENCY ONE • EMTEC ENERGY • ENDT • ENERCON • ENERGY EVALUATION • ENERGY TECHNOLOGY CENTRE • ENGINEERGIRL.ORG • ENGINEERING & BEYOND LTD • ENGINEERING SERVICES MULL • ENGINEERING UK • ENGINEERS WITHOUT BORDERS • ENSCO • ENVIRONMENT AGENCY • EON • EPIC GAMES • EQUINOR • EQUITUS ENGINEERING • ERICSON MANUFACTURING • ERICSSON • ERIKSERNIE'S • ESE LTD (ENGINEERING SOLUTIONS & ENERGY) • ESN • ESRI • ESSEX COUNTY COUNCIL • ETHOS ENERGY • EUROPEAN SPACE AGENCY • EURO THERM • EXECUTIVE NETWORK GROUP • EXON MOBILE • EXPERIANEXPERT AVIATION SOLUTIONS • EXPRO • F.E.S. LTD • FAB • FACEBOOK • FALKIRK WHEEL • FAREHAM COLLEGE • FAT BUZZ • FCE GROUP • FCE LEVEN • FEADRILL • FENIX EVENTS LTD • FERGUSON MARINE • FIFAB • FIFE COLLEGE • FIFE COUNCIL • FIFE FABRICATIONS • FILAMENT PD • FILESPIN.IO • FILTRONIC BROADBAND LTD • FINNING • FINTRY DT • FIRE SERVICE • FIRMA ENGINEERING • FIRST BUS • FITBIT FORESTRY COMMISSION • FLUIDLY • FMC TECHNOLOGIES • FOODMEK • FOREIGN AND COMMONWEALTH OFFICE • FORD MOTOR COMPANY FUND • FORMAPLEX LTD • FORMULA ONE • FORSYTHS • FORT VALE • FORTH BRIDGES PROJECT • FORTH ELECTRICAL SERVICES • FORTH PORTS LTD • FORTH REPLACEMENT CROSSING • FORTH VALLEY COLLEGE • FOSTER WHEELER ENERGY LTD • FOUR LINES MODERNISATION (4LM) • FRANKS INTERNATIONAL • FRAS-ISLA LTD • FRASER ELECTRICAL • FRASER NASH CONSULTANCY • FREESCALE • FTV PROCLAD • FUJITSU • FUSION ENERGY • FUTABA UK • GATWICK AIRPORT • G ENERGY • G.S.K • GAIST SOLUTIONS • GALLAGHER AND MCKINNEY ENGINEERING • GALLIFORD TRY INFRASTRUCTURE WATER • GALLOPER WIND FARM • GAMESA • GAMESAWIND UK LIMITED • GAS MEASUREMENT INSTRUMENTS LTD • GATE SOLUTIONS • GE AVIATION • GE CALEDONIAN • GE ELECTRIC • GE OIL & GAS • GE WELLSTREAM • GEC ENERGY SYSTEMS LTD • GEDA CONSTRUCTION • GENERAL ELECTRIC • GENERATION SCIENCE • GENERATIONS OF POWER AND POWERHOUSE WORKSHOP • GENTECH INTERNATIONAL LTD • GEOMARINE • GEORGIA TECH • GEOTECHNICAL • GHD • GILLEM CONSTRUCTION SERVICES LTD • GIRVAN MOTORS • GLASGOW CALEDONIAN UNIVERSITY • GLASGOW CITY COUNCIL • GLASGOW PRESTWICK SPACEPORT •

Appendix A: Supporters of the ‘If you were an engineer, what would you do?’ Leaders Award Competition

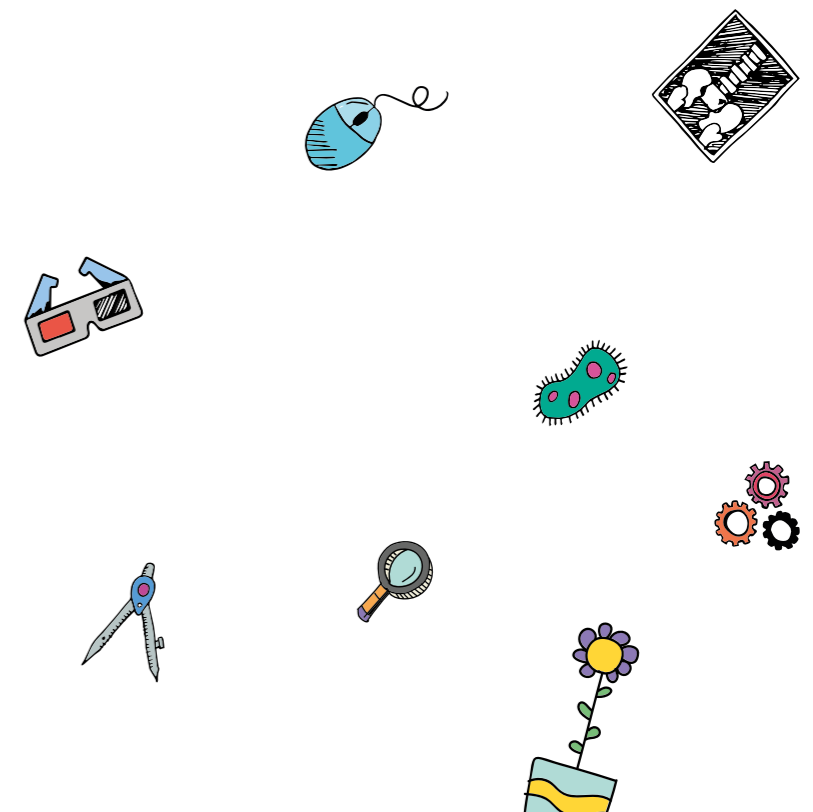
GLAXO SMITHKLINE BEECHAM • GKN AEROSPACE • GKN AUTOMOTIVE • GOLDIEBLOX • GOOGLE • GOONHILLY • GOUND ENGINEERING • GOUROCK GOLF CLUB • GORDON MURRAY AUTOMOTIVE • GRADON ARCHITECTURE • GRAINTEK • GRANGEMOUTH OIL REFINERY • GRANGER REIS • GREATER MANCHESTER COMBINED AUTHORITY (GMCA) • GREEN DEAL YOUR HOME LTD • GRISSAN • GROUND ENGINEERING • GROUND SIX • GSK PHARMACEUTICAL • GTG • GUDEL • GULLIVER'S WORLD • GUNT TECHNOLOGY • H AND S AVIATION • H M INSPECTORATE OF HEALTH AND SAFETY • H2 OIL & GAS • HAFREN WATER • HALLIBURTON • HAMMERMEN OF GLASGOW • HAMPSHIRE COUNTY COUNCIL • HANDPRINTS - ENABLE • HANNAH & HOWIE • HANON • HARLEY HADDOW • HASSACK AVIATION LTD • HATCH ASSOCIATES • HAWKINS & ASSOCIATES LTD • HEALTH & SAFETY EXECUTIVE • HEATHROW AIRPORT • HEATTECH LTD • HELI-CHARTERS • HERIOT WATT UNIVERSITY • HEWLETT PACKARD • HI-TECH PRECISION ENGINEERING • HIDECS CONSULTANCY • HIGH LINE • HIGH SPEED 2 • HIGHLAND BIOSCIENCES • HIGHLAND CAMPER VANS • HIGHLAND COUNCIL • HIGHLAND SPRING WATER • HIGHWAYS AGENCY • HINCKLEY & BOSWORTH BOROUGH COUNCIL • HITACHI • HKA GLOBAL • HMGCC • HOARE LEA • HOLYWOOD ENGINEERING SERVICES • HONDA RACING • HONEYWELL AEROSPACE • HOOK MARINE LTD • HOOVER • HORIBA-MIRA • HORNBY • HOTPOINT • HOWDEN • HOWDEN PROCESS COMPRESSORS • HP • HPI VERIFICATION SERVICES LTD. • HPL • HSE • HUNTERSTON POWER STATION • HVAC & REFRIGERATION ENGINEERING • HYDRAM ENGINEERING LTD • HYDROPOWER & DAMS JOURNAL • HYSPEC • IAN HITCHMAN FABRICATIONS • IBERDROLA • IBM • ICI • IDGTE • IGGESUND • IGJEN • IGS • IHC ENGINEERING • ILLUMINATE TECHNOLOGIES • IMO • IMPERIAL COLLEGE LONDON • IMRANDD LIMITED • INDIE SEMICONDUCTOR • INEOS • INFOSYS • INK DESIGN • INNOGY • INNOVATE UK • INNOVATION INDUSTRIES • INSPIRE ALPINE • INSTITUTION OF CIVIL ENGINEERS (ICE) • INSTITUTION OF ENGINEERING AND TECHNOLOGY (IET) • INSTITUTION OF MECHANICAL ENGINEERS (IMECHE) • INSTRUTEC CONTROLS LTD • INTEGRITECH • INTEL • INTELLIGENT MACHINES LTD • INTERFLOW TECHNOLOGY • INTERWELD • INTERXION • INVENTOR • INVERCLYDE COUNCIL • IPC SYSTEMS • IROBOT • IRVINE PAPER MILL • ISCO • ISG • ISLAND TUG • ISLE OF MAN • ISLE OF MAN CHAMBER OF COMMERCE • ITALIAN AIR FORCE • ITECH • ITS • JACOBS • J & P METAL TECHNOLOGIES • J.E.S ENTERPRISES • J2 ENGINEERING • JAGUAR LAND ROVER • JAMES FISHER DEFENCE • JAMES WALKER DEVOL • JCB • JCP ENGINEERS • JED BARKER • JEE • JERSEY ELECTRICITY • JET SKI • JET2 • JGPS • JLR • JO MALONE • JOHN CRANE • JOHN H MCNAE LTD • JOHN M HENDERSON • JOHN OAKES AND SON • JOMAS ASSOCIATES • JONES BROS (CIVIL ENG) CO LTD • JOTUN • JP KENNY • JP MORGAN • JPP CONSULTING LTD • JTPK • KAIAM CORPORATION • KANTHAL • KAVIA TOOLING KCL MEA LEAN ASSOCIATES LTD • KCP ENVIRONMENTAL • KD ALLAN LTD. • KEEP MOAT • KENT INVENTORS FORUM • KENWOOD • KESS • KEYSTONE APPLIED TECHNOLOGIES • KFT LTD • KIER • KIER MINING • KILMARNOCK COLLEGE • KINGSTON UNIVERSITY LONDON • KING'S COLLEGE LONDON • KIRKLEES COUNCIL • KIWI DESIGN • KLM • KNIGHTS BROWN • KNOCKHILL RACING CIRCUIT • KOMATSU EUROPE • KPMG • KSW • KUKA ROBOTICS • LACERTA TECHNOLOGY LTD • LAING O'ROUKE • LAMONT JOINERS • LANCASTER UNIVERSITY • LAND ENERGY • LAWRENCE ENERGY LIMITED • LEEDS UNIVERSITY • LEGENDRE-CONTRACTOR • LEGO • LEND LEASE • LEONARDO HELICOPTERS • LEONARDO UK • LIFE SCAN • LINKEDIN • LIVEASY • LIVERPOOL HOPE UNIVERSITY • LLOYD'S REGISTER GROUP • LLOYDS BANK • LOGANAIR • LONDON OFFSHORE CONSULANTS • LONDON UNDERGROUND • LOTHIAN BUSES • LOUGHBOROUGH UNIVERSITY • LUCY ELECTRIC • LZ BMX • M DESIGN UK LTD • MAC GAS • MACFARLAN SMITH • MACRETE • MAERSK OIL • MAGLEV • MAGNOX • MAHLE • MAIN TOOL • MALIN MARINE CONSULTANTS LTD • MALLAGHAN ENGINEERING • MANCHESTER METROPOLITAN UNIVERSITY • MANTECH • MANUFACTURE AND DESIGN • MANUFACTURE USING ADVANCED POWDER PROCESSES (MAPP) • MARDON MEDIA • MARKINCH POWER STATION • MARRILL • MARSHALLS TLC • MARTIN AEROSPACE • MAST GROUP LTD • MASTENBROEKS • MAXON MOTORS • MAZDA • MAZIAK COMPRESSOR SERVICES LTD • MBDA UK • MCALPINE • MCCOLM ENGINEERING • MCDONALD BUILDERS • MCLAREN • MCLAUGHLIN HARVEY • MCTAGGART CONSTRUCTION • MEA LEAN ASSOCIATES LTD • MECHANICAL ENGINEERING COMPLIANCE • MEGGIT AVIONICS • MEILLEUR • MEKAMON • MEL AVIATION • MERC PHARMACEUTICALS • MERCEDES • MERCHANT NAVY • MERCK MICROSOFT • MERCURY MOTORSPORT • MERLIN ENTERTAINMENT • METHIL DOCKYARD • MICHELIN SCOTLAND INNOVATION PARC • MICRO MOBILITY SYSTEMS LTD • MICROSOFT • MIDDLESBOROUGH COLLEGE • MIME COUNCIL • MINDTECH GLOBAL • MINISTRY OF DEFENCE (MOD) • MINOLTA BUSINESS SOLUTIONS • MIRA • MIRRELL • MIRREN • MITCHELL DESIGN SOLUTIONS • MITIE • MITSUBISHI • MITSUBISHI ELECTRIC • MJ ASSOCIATES • MKCTS • MONTROSE • MOOG AIRCRAFT GROUP • MOORE SPEED RACING • MORGAN SINDALL • MORRISH CONSULTANT ENGINEERS • MORRISONS CONSTRUCTION • MORSON PROJECTS • MOSDORFER CCL SYSTEMS LTD • MOTACARE • MOTOROLA • MOTT MACDONALD • MOUCHEL • MTAIL • MTE • MTL • MYLAN • N-SEA • NAMSCO FUNSCAPE • NANOTICS • NAPIER BROS ENGINEERING LTD • NASA • JAMES WEBB TELESCOPE • NATHAN BARKER • NATIONAL AIR TRAFFIC SERVICES (NATS), PRESTWICK • NATIONAL COMPOSITE CENTRE • NATIONAL GRID • NATIONAL INVENTORS COUNCIL • NATIONAL NUCLEAR LABORATORY • NATIONAL OILWELL VARCO • NETWORK RAIL • NATO SUBMARINE RESCUE SYSTEM • NATURAL POWER • NATWEST NAUTICAL COLLEGE • NCB • NCR • NEFFA • NEIMME • NEOGEN • NESTLE • NEUTRAL AUTOMATIC LTD. • NEW FOREST COUNCIL • NEWCASTLE COUNCIL • NEWCASTLE UNIVERSITY • NEWLINE UTILITIES • NEWSPRINTS • NEWTON PRECISION • NEWTON SKIP HIRE • NEXUS • NEXUS METRO • NFK ELECTRICAL SERVICE • NG BAILEY • NHS • NICHOLAS MACHINE WORKS • NIPPON GASES • NISSAN • NIVEN PLANT HIRE • NLAS • NOC • NOMENCA • NORBORD • NORBULK • NORDEX • NORTH AYRSHIRE COLLEGE • NORTH DOWNES MAINTENANCE SERVICE • NORTH WEST REGIONAL COLLEGE • NORTHERN POWER GRID • NORTHERN RAIL • NORTHSTONE • NORTHUMBRIA WATER • NORTHERN POWERGRID • NOV OIL RIG • NOVEL CONSULTING ENGINEERS PASCE • (NPL) NATIONAL PHYSICS LABORATORY • NUERA MOBILITY INC. • NUFAB • NUSTEM • NUVIA LTD • NWL • NXP SEMICONDUCTORS • OCEAN ENGINEERING INTERNATIONAL SERVICES LTD • OCEANEERING OGILVIE HOMES • OEV • OFFSHORE RENEWABLE ENERGY CATAPULT • OFFSHORE WIND FARMS • OIL & GAS ENGINEERING SOLUTIONS • OIL AND GAS UK • OIL MACHINE DYNAMICS (SMD) • OLDHAM COUNCIL • OLDHAM ENGINEERING • OLDHAM ENTERPRISE TRUST • OMNIA CONSULTING • OPEN CAST SOFTWARE • OPENREACH • OPTOS • ORACLE • ORBITAL MARINE POWER • ORCINA • ORE CATAPULT • OVE ARUP • OWLSTONE • OXSIGHT LTD • PAILTON ENGINEERING • PAISLEY ENGINEERING • PALM EQUIPMENT • PARKER HANNIFIN • PARSONS BRINKERHOFF • PATERSON COOKE • PATRICK PARSONS • PAUL OWEN ASSOCIATES • PAULTONS PARK • PC AND FONETECH UK • PC HENDERSON PEARSON ENGINEERING • PD&MS ENERGY • PDL SOLUTIONS • PEACOCKS ENGINEERING GROUP • PEARSON ENGINEERING • PEAK SCIENTIFIC • PELAMIS WAVE POWER • PENMAN ENGINEERING LTD • PENTAIR • PENTOIR • PEPSICO • PERKINS • PERTH COLLEGE • PERTH ENGINEERING SERVICES • PETER BRETT ASSOCIATES • PETROFAC OFFSHORE ENGINEERING AND OPERATIONS • PETROINEOS • PETZILLA • PEUGEOT • PFIZER • PHABRIX LTD • PHILLIPS 66 • PHONE SMART • PICK EVERARD • PK MECHANICS • PLASHET SCHOOL • PLATINUM ELECTRICAL ENGINEERING • PLEXUS • PLYMOUTH INCINERATOR • POLAR ELECTRO • POLYTECH • POOLE AND BOURNEMOUTH COLLEGE • PORT OF DOVER • PORT TRAINING SERVICES • POTTER & POTTER LTD • POWER CO-GENERATION PLANT COMPANY • POWER OASIS • PRECISION INTERNATIONAL • PRESTWICK AIRPORT • PRESTWICK AIRPORT/SPACEPORT • PRICE AND MYERS • PRICE MYERS • PROCTOR & GAMBLE • PRODRIVE • PROJECT CENTRE • PSTT • QINETIQ • QTS GROUP • QUADCARE • QUAKER OATS LTD • QUANTA COMPUTERS • QUANTUMDX GROUP LTD • QUARTZELEC LTD • QUEEN MARY'S UNIVERSITY • QUEENS UNIVERSITY BELFAST • QUEENS FERRY CROSSING PROJECT • QUICK HYDRAULICS • R. SHANKLAND AND SONS • R.W.E WINDPOWER • RACETECH • RAEBURN DRILLING & • RAES AUTO SERVICES • RAM • RAMBOLL • RAPISCAN SYSTEMS • RAUTOMEAD • RAYNESWAY • RAYTHEON • RAYTHEON RBA ACOUSTICS • RBS TECH SERVICE REACTION ENGINES • RDA CONSULTANTS • RED BULL • RED ENGINEERING • REECE FOUNDATION • REMAP • REME • RENAULT RACING • RENEWABLE ENERGIES • RENFREWSHIRE COUNCIL • RENISHAW • RES • RESPONSIVE ENGINEERING • RICARDO • RIKEN RESEARCH CENTRE • RIVER CLYDE HOMES • RJ BLASTING • RJ MACLEOD • RNAD COULPORT • ROCHDALE BOROUGH COUNCIL • ROCHDALE DEVELOPMENT AGENCY • ROBERT GORDON UNIVERSITY • ROBERT STEPHENSON AND CO. • ROBERTS CONSULTING • ROBERTSONS • ROBOT WARS • ROBOTICS • ROCHESTER BRIDGE COMMISSION • ROCHESTER INSTITUTION OF TECHNOLOGY • ROCKATEK LIMITED • ROCKWELL AUTOMATION • ROD MUNRO LTD • RODGERS LEASK LTD • ROGERS SKIP HIRE • ROKE MANOR • ROLLS ROYCE • ROPOT • ROSE PARTNERS • ROSEN • ROSK ENGINEERING • ROSS GOWER • ROTOMOTIVE LTD • ROTROK HYDRO-ELECTRIC • ROYAL AIR FORCE • ROYAL AIR FORCE CHARITABLE TRUST (RAFCT) • ROYAL ACADEMY OF ENGINEERING • ROYAL ASTRONOMICAL SOCIETY • ROYAL BANK OF SCOTLAND • ROYAL ELECTRICAL AND MECHANICAL ENGINEERS • ROYAL ENGINEERS • ROYAL HASKONING DHV • ROYAL HOLLOWAY • ROYAL

Appendix A: Supporters of the 'If you were an engineer, what would you do?' Leaders Award Competition

IHC • ROYAL MAIL • ROYAL MARINES • ROYAL OBSERVATORY EDINBURGH • ROYAL NAVY • ROYAL SCHOOL OF MILITARY ENGINEERING • RPS • RRS SIR DAVID ATTENBOROUGH • RSP CONSTRUCTION • RUPPEL • RWE • RYANAIR • SAND H WELDING SERVICES • SAND O PROPERTY SERVICES • S-CUBED • S.E.S • S.S.E • S&C ENGINEERING • S&K MACDONALD • SA CATAPULT • SAC • SAFRAN LANDING SYSTEMS • SAIPEM LTD • SAJ CONSULTING • SAMSUNG • SANDISK • SARCLAD LTD • SAVE WATER • SCC • SCENTED SYSTEMS • SCHLUMBERGER • SCHNEIDER ELECTRIC • SCIENTIST IN RESIDENCE AT WHS • SCORE GROUP UK • SCOTEC • SCOTLAND TRANSERV • SCOTRAIL • SCOTSOUN HOUSE • SCOTT BENNETT ASSOCIATES • SCOTT CHARLES & PARTNERS • SCOTT CONSULT • SCOTTISH & SOUTHERN ENERGY POWER DISTRIBUTION • SCOTTISH AND SOUTHERN ENERGY • SCOTTISH BUSINESS RESILIENCE CENTRE • SCOTTISH ENERGY ASSOCIATION • SCOTTISH ENGINEERING • SCOTTISH ENTERPRISE • SCOTTISH GAS • SCOTTISH HYDRO • SCOTTISH ENGINEERING • SCOTTISH LEATHER GROUP • SCOTTISH MANUFACTURING ADVISORY SERVICES • SCOTTISH POWER • SCOTTISH POWER RENEWABLES • SCOTTISH WATER • SEA CADETS • SEAGATE • SEBSEA7 • SECURUS • SEGUIN & CO • SELEX GALILEO • SELEX-ES • SELLAFIELD • SEMCO • SEMCO MARITIME • SEMTA • SENERGY DEVELOPMENT SOLUTIONS • SEPA • SETEC LIMITED • SEVCON • SFD • SGL CARBON • SGMA • SGN • SGURR ENERGY • SHELL OIL • SHETLAND SCHOOL OF NAUTICAL STUDIES • SIBCAS • SIEMENS ENERGY • SIEMENS SUBSEA SYSTEMS • SILBERLINE • SILOKINC • SIMMS • SIMPSONS AUTO ELECTRICAL • SIR ROBERT MCALPINE • SIX CYLINDER LTD • SKANSKA • SKILLS DEVELOPMENT SCOTLAND • SKILLS JERSEY • SKY • SKYLAB • SKYRORA SKYSCANNER • SLG TECHNOLOGY • SMC • SMC MILTON KEYNES • SMITH & MCLAURIN • SMITH ANDERSON • SMITH DIXON ASSOCIATES • SOFTWARE CITY • SMITHSWOOD • SOAPWORKS • SODEXO SOFTWARE • SOIL MACHINE DYNAMICS • SOLAR PANEL • SOLE TECHNOLOGY INC. CALIFORNIA • SOLENIS • SOLUTIONS FOR THE PLANET • SOLUTIONS LTD • SOUND TOWN • SOUTH DEVON COLLEGE • SOUTHBANK UNIVERSITY • SOUTH TYNESIDE COUNCIL • SOUTHERN WATER • SP ENERGY NETWORK • SPACE EXPLORATION TECHNOLOGIES • SPACE X • SPARROWS ENGINEERING & OPERATIONS • SPARROWS OFFSHORE • SPECIAL STRUCTURES • SPEEDY • SPF DESIGN SOLUTIONS LTD • SPILASERS • SPIRE • SPIRIT AEROSYSTEMS • SPROCKET DC LTD • SPX • SQT RAIL LTD • SSE • SSE HYDRO • SSEN • SSPCA • ST GEORGE'S HOSPITAL • ST MARY'S HOSPITAL LONDON • ST MICROELECTRONICS • ST ANDREWS JOINERY • STAGECOACH • STANTEC UK • STAR REFRIGERATION • STATIC SYSTEMS GROUP • STATES OF JERSEY • STENA • STFC • STIRLING COUNCIL • STOP GO NETWORKS LIMITED • STOLLER CHARITABLE TRUST • STORK • STRACHAN INTERVENTIONS • STRAUSS ENGINEERING • STS • SUBSEA7 • SUBSEA LTD • SUBSEA WELLS • SUN MICROSYSTEMS • SUNSTONE/PREMIER FOODS • SWAGELINING • SWANKIE CREATIONS • SWECO UK LIMITED • SYNGENTA • SYNTHACE • SYRACUSE UNIVERSITY • SYSTEM HYDRAULICS, CARLISLE • TAQA • TARAGENYX • TARMAC • TATA ELXSI • TAYLOR AND FRASER • TEAKITHON • TEAL CONSULTANCY • TEAM CONSULTING • TECAN • TECHNICKON TEQNOX • TECHNIP FMC • TEES VALLEY COMBINED AUTHORITY • TEREX • TERUMO AORTIC • TES • TESCO BANK • TESLA • TEXACO • TEXAS INSTRUMENTS • TRANSPORT FOR LONDON (TFL) • THALES • THALES ALENIA SPACE • THALES OPTRONICS • THAMES PRODUCTIONS • THAMES WATER • THARSUS • THE ADVANCED MACHINERY & PRODUCTIVITY INSTITUTE (AMPI) • THE ENGINEERING TRUST • THE BERKELEY GROUP • THE CARBON TRUST • THE COMPUTER SPECIALIST • THE CYBORG FOUNDATION • THE INSTITUTION OF ENGINEERS IN SCOTLAND (IES) • THE MACROBERT TRUST • THE LAUNCHPAD PROJECT • THE OCEAN CLEANUP • THE ROOFING COMPANY • THE ROYAL OBSERVATORY, EDINBURGH • THE TEV PROJECT • THE UNIVERSITY OF EDINBURGH • THE UNIVERSITY OF SHEFFIELD • THERMOFISHER • THERMOFISHER SCIENTIFIC • THERMOTECH • THINK PHYSICS • THISTLE SEAFOODS • THOMAS ASH AND SONS LTD • THOMSON ENGINEERING • TIDEWAY • TIG TAG • TINKER AND HAWK • TINNE CONSULTANTS • TJ HAZELS • TONY GEE AND PARTNERS LLP • TORISHIMA • TOSHIBA MEDICAL • TOUCH BIONICS • TOUGH CONSTRUCTION • TOYOTA • TPS - WELDTech • TRACSIS • TRANSERVE SCOTLAND • TRANSPORT SCOTLAND • TRANSOCEAN • TRIUMPH • TRW AUTOMOTIVE • TSL CONTRACTORS LTD • TT ELECTRONICS • TTS • TURNER TOWNSEND • TUV NEL • TUV-SUD • TYCO AEROSPACE • UBS • UCL ENGINEERING • UK ASTRONOMY TECHNOLOGY CENTRE • UK INJECTOR REMOVAL • UK POWER NETWORKS • UK RADON • UK SPACE AGENCY • UKRI • ULSTER UNIVERSITY • UNILEVER • UNIMATION INC. • UNIPRESS • UNITED TECHNOLOGIES CORPORATION • UNITED UTILITIES • UNITY PARTNERSHIP • UNIVERSITY COLLEGE LONDON (UCL) • UNIVERSITY OF CENTRAL LANCASHIRE (UCLAN) • UNIVERISTY OF YORK • UNIVERSITY OF BRISTOL • UNIVERSITY OF CAMBRIDGE • UNIVERSITY OF CUMBRIA • UNIVERSITY OF DUNDEE • UNIVERSITY OF DUNDEE/AFBE • UNIVERSITY OF EAST LONDON • UNIVERSITY OF EXETER • UNIVERSITY OF GLASGOW • UNIVERSITY OF GREENWICH • UNIVERSITY OF HERTFORDSHIRE • UNIVERSITY OF HUDDERSFIELD • UNIVERSITY OF KENT • UNIVERSITY OF LINCOLN • UNIVERSITY OF MANCHESTER • UNIVERSITY OF NEWCASTLE • UNIVERSITY OF NOTTINGHAM • UNIVERSITY OF PLYMOUTH • UNIVERSITY OF PORTSMOUTH • UNIVERSITY OF SALFORD • UNIVERSITY OF SOUTHAMPTON • UNIVERSITY OF STRATHCLYDE • UNIVERSITY OF SUNDERLAND • UNIVERSITY OF SURREY • UNIVERSITY OF THE HIGHLANDS & ISLANDS • UNIVERSITY OF WEST OF SCOTLAND • UNIVERSITY OF THE WEST OF ENGLAND (UWE BRISTOL) • UNIVERSITY OF WOLVERHAMPTON • UTAH UNIVERSITY • UTC AEROSPACE SYSTEMS • UWS • V. GROUP • VALMET • VASCUTEK • VAUXHALL • VCL • VECTOR AREOSPACE • VEKA • VELCRO COMPANY • VELOCITY • VEOLIA • VESUVIUS • VG ENERGY • VG GROUP • VILA RAIL • VIRGIN ATLANTIC • VIRGIN MEDIA • VIRIDOR • VIRTUAL INSTRUMENTS FIBRE OPTICS, PERFORMANCE AND CLOUDS • VODAFONE • VOLKERSTEVIN • VOLKERWESSELSUK • VOLKSWAGON • WAGELINING LTD • WANDLE HOUSING ASSOCIATION • WALKER PRECISION ENGINEERING LTD • WALLACE BAGPIPES • WARBURTONS • WARMINSTER LTD • WARTSILA UK LTD • WATERFRONT • WATERMAN • WATERMISER • WATES CONSTRUCTION • WAVE ENERGY SCOTLAND • WAVEGEN • WCM NATIONAL • WDC • WEATHERFORD • WEBER • WEBTEC • WEEE SOLUTIONS • WEIR GROUP • WEIR MINERALS • WEIR WATER LIMITED • WESSEX WATER WIND POWER • WEST HILL WIND AND SOLAR FARM • WEST LOTHIAN COLLEGE • WEST SCOTLAND COLLEGE • WESTCOTT CIVILS • WESTERN FERRIES (CLYDE) LTD • WHITELEE WINDFARM • WHITTAKER ENGINEERING • WILL RUDD DAVIDSON LTD • WILLIAM HARE • WILLIAMS F1 • WILLMOTT DIXON CONSTRUCTION • WIND TURBINES • WINCHESTER SCIENCE CENTRE • WINSTANLEY COLLEGE • WIPAC • WJ & W LANGS • WL GORE • WOOD GROUP • WOODBLOX • WOODMAC • WOODWARD • WOODWARD ENGINEERING • WORLEY PARSONS • WPE • WRD ENGINEERS • WSP PARSONS BRINCKERHOFF • WSP UK LTD • XMA • YAHOO • YOUNG ENGINEERS EDINBURGH • YOUTUBE • ZEEKO • ZERO CARBON FUTURES • ZURICH ENGINEERING

Appendix B: List of Primary Engineer most watched Interviews with Engineers

1. Carl Starr. At the time of interview was James Webb Space Telescope Mission Operations Manager at NASA and is now Senior Program Manager for Millennium Space Systems, A Boeing Company. YouTube link - <https://www.youtube.com/watch?v=U3WcfM9cTRU>
2. Alice Bunn. CEO of the Institution of Mechanical Engineers. YouTube link - <https://www.youtube.com/watch?v=iky0vpxHAYk&t=194s>
3. Nicole Stott. Currently Director at Space For Art Foundation Inc, Senior Technical Consultant at ILC Dover, an artist, a book author and former NASA Astronaut. YouTube link - <https://www.youtube.com/watch?v=fxrD8Ehu4RQ&t=3s>
4. Ciara McGrath. Lecturer in Aerospace Systems at University of Manchester. YouTube link - <https://www.youtube.com/watch?v=W3btJOjsQ9I>
5. Malcolm Ridley. Chief Test Pilot at Airbus Commercial Aircraft. YouTube link - <https://www.youtube.com/watch?v=20TqBHKaOQ>
6. Alyssa Carson. Astronaut in training for NASA. YouTube link - <https://www.youtube.com/watch?v=6odbukScZOY&t=919s>
7. Mo Taher. Aerodrome Systems Specialist and is now on secondment as a content producer after building a huge social media following at Heathrow Airport. YouTube link - https://www.youtube.com/watch?v=nwKQ6VGzc_E&t=6s
8. Lucy Edge, Acting CEO at Satellite Applications Catapult. YouTube link - <https://www.youtube.com/watch?v=ic-6fle5pZ0&t=162s>
9. Buki Okoro. Manufacturing Process Engineer at Ford Motor Company. YouTube link - <https://www.youtube.com/watch?v=5-qK9HHPDz0&t=1101s>
10. Sunita Williams - NASA Astronaut and Engineer. YouTube link - <https://www.youtube.com/watch?v=w9xe1MVxe30>



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