

Getting the message across

Top tips for delivering inspiring engineering activities



Providing opportunities for young people to take part in hands-on activities and experience the world of engineering is crucial to inspiring the next generation of engineers.

In this guide, you will find top tips for planning and delivering impactful activities that inspire as many students as possible with positive messages about careers in engineering.

The information contained in this guide can provide a useful starting point when planning, delivering and evaluating a session and is intended to enhance, rather than replace, existing knowledge and guidance. The best outreach happens when a relatable STEM role model or ambassador uses their unique skillset and personality to bring a session to life through their own experiences of the world of work, so above all, be yourself!

Engineering makes a significant contribution to the economy, to employment and to society. However, the demand for engineers outstrips supply and more needs to be done to showcase the range of exciting and meaningful career opportunities available in 21st century engineering. We need to increase the number and diversity of young people going into engineering by helping them understand the relevance of subjects such as science, maths, D&T and computing and the doors that could be opened by continuing with these - and other connected - subjects.

Engineers transform the way we live. Their work cuts across every conceivable area, from renewable energy and medical technology to disaster response and space exploration. It is our job to nurture the engineers of the future and show young people that through a career in engineering they could have an impact on a global scale.

*Eleanor Eyre
Head of Careers, EngineeringUK*

Watch the webinar, **'talking about engineering careers with young people'** for more hints and tips on how to approach these types of conversations with students: tomorrowsengineers.org.uk/talk-about-careers





Embedding careers inspiration and information

Fantastic face-to-face and virtual activities (including talks, presentations, hands-on workshops, challenges, shows and fairs) can be made even more impactful by putting careers inspiration and information at the heart of the session, in an age-appropriate way.

The Gatsby careers benchmarks - and the DYW Career Education Standard in Scotland - give schools a framework for providing students with the best possible careers guidance. You can support career related learning by providing a real-world context for students' classroom learning, which is invaluable to the school, who may also want to understand how aspects of your work link to the curriculum.

Engineering is a career that may be unfamiliar to students, with many never having had the chance to study it at school. Making links between the skills

involved in the subjects they do study - such as maths, science, D&T, computing, geography, art and languages - and exciting job roles in engineering, can really help students realise the value of these subjects for the future and switch them on to the idea of a career in engineering.

Before starting the session, ask students to come up with examples of engineering from the world around them, then check back in at the end of the session to see how their understanding has changed. Students could draw, write or call out their suggestions.

CASE STUDY: Future Frontiers

Atkins and Faithful+Gould have partnered with Future Frontiers, an award-winning education charity, to deliver virtual coaching to young people experiencing economic inequality.

Future Frontiers partners students with industry professionals in a series of intensive 1:1 career coaching sessions. The aim of the programme is to ensure these students fulfil their potential at school and when transitioning to education or training at age 16. All students who are selected for Future Frontiers programmes meet one or more indicators of socio-economic disadvantage, are underachieving academically and are at risk of not moving onto high quality education or training aged 16.

Volunteer coaches are trained in facilitating open conversations that spark interest in future career options. Pupils receive 4, 90 minute coaching sessions followed by a meeting with a 'sector role model' from an identified career of interest, for example, STEM.

In the first 2 years of partnering with Future Frontiers, Atkins and Faithful+Gould have coached around 60 pupils from across England.

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[atkinsglobal.com](https://www.atkinsglobal.com)

Having an impact - points to consider:

- **Motivating factors for career decision-making.** Research by EngineeringUK reveals the impact the Covid-19 pandemic has had on motivation, with job security, job opportunity and making a societal impact, some of the top concerns for young people when considering future careers. Findings from EngineeringUK's 2021 Engineering Brand Monitor also show that young people want to do something that interests them, something they enjoy and something that is well paid.
EngineeringUK, Young people and Covid-19, 2020
- **Describing the skills that engineers use,** such as creativity, communication, teamwork, problem-solving, determination and adaptability, so that students can begin to identify their own skills and relate these to engineering. It is worth stressing to students that 'failing' is a really important part of creating a new product and is part of the development cycle. The 'Meet the future you' careers quiz, helps students work out how their own skills and interests relate to different types of engineering. Find out more at: mtfy.org.uk
- **Speaking about your background and career history.** It is the personal story of your career that will spark an interest in students, so enjoy telling the story! It's worth ensuring students are aware there are different routes into engineering, such as vocational qualifications, T levels, apprenticeships (including degree apprenticeships) and degrees. Maths and science (especially physics) are relevant for engineering, but students don't need to be at the top of the class in these subjects. There are lots of other useful subjects too, including design and technology (D&T), computing, art, geography, electronics, construction & the built environment and languages. The 'Engineer your future' PowerPoint presentation could help bring out these messages. tomorrowsengineers.org.uk/engineer-your-future
- **Finding out whether the students are at key decision-making points,** for example, choosing their subject options. Make sure you know what the qualifications are called and be aware of the grading system. GCSEs use numbered grading, where 9 is the highest and 1 is the lowest. Grade 4 is equivalent to a 'C' grade or a pass. Check with the school or college in advance if you're not sure.
- **Highlighting different industries,** such as health and wellbeing, the environment, sport, space, entertainment, food and drink and artificial intelligence, to show students that whatever they're interested in, there is engineering involved. You could think about using some of the Tomorrow's Engineers careers resources, including the case studies, to facilitate discussions on different topics within engineering and encourage teachers to have a look at the hands-on experiences available for their school. neonfutures.org.uk
- **Reflecting local, regional and national opportunities and growth industries,** where possible. If you recently entered the workplace, you could relate this to your experiences of job-hunting. EngineeringUK publishes an analysis of the demand for engineers forecast: engineeringuk.com/research/data



In your session, show how engineers use their skills to solve some of the big issues young people care about, such as helping people recover from natural disasters, working to achieve net zero, tackling homelessness and developing vaccinations and cures for diseases. The 'Meet the future you' careers quiz is a short, online quiz that helps students work out what type of engineer they could be and how they could use their skills to benefit society.

mtfy.org.uk

Chartership

For students still in their teens, **chartership and professional registration are unlikely to be of significant concern, so a light touch approach to these conversations is advised. The following explanation could be useful for these sorts of questions.**

"Engineers can work towards professional registration, earning the right to use letters after their name, such as CEng (Chartered Engineer) – a status which is recognised all over the world.

Like doctors and lawyers, professionally registered engineers are well respected."

Key messages

There are so many fantastic reasons to go into engineering and you will be able to demonstrate several of these through your own experiences.

The '10 great reasons to become a scientist or engineer' poster can provide further inspiration: neonfutures.org.uk/10-great-reasons

It talks about:

- Making a difference
- Finding your own route
- Following your passion
- Earning good money
- Being creative
- Having great career prospects



There is also a collection of diverse engineering case studies on the website – if you have the technology available in your session, you could show one or 2 of these to the students, to help give a flavour of what the world of work is like: neonfutures.org.uk/case-study



Inclusivity

Whether you are giving a talk or running a hands-on activity, find ways to include everybody in the session. It is good practice to ask the responsible adult whether any of the young people have additional needs, in advance of the session, and seek advice on any adaptations that may be required. Young people learn in different ways - some need visual stimulation, others like to listen, and some students are practical and like to 'have a go'. Switching topic and delivery method throughout the session will make sure you keep the students' focus.

Here are some top tips on how to get the best out of young people during your session:

- **Smile, be aware of your body language** and try and look at different people when you are talking.
- **Create an open and supportive environment** in which students feel able to ask questions - however 'silly' they think their question might be.
- **Keep things moving and use different delivery methods**, such as interactive quizzes, hands-on activities, presentations (with lots of images) and small group discussions.
- **Encourage everyone to participate** and provide opportunities for those who appear less engaged to contribute. Be mindful of neurodiversity and different learning and communication styles. Working in pairs, for example, might suit some students better than whole class discussions.
- **Be mindful of those with additional needs**, for example, wheelchair users, visually impaired students, and deaf students. The teacher or responsible adult should be able to identify any students with additional



needs in advance of the session and support you in meeting individual needs.

- **Consider your vocabulary** - use gender neutral language, such as 'students' rather than 'boys and girls' and be careful not to make assumptions about gender identity. Avoid any stereotyping and make sure the content is age-appropriate. Avoid jargon! For instance, most students won't know what an 'industry' or 'sector' is.
- **Remember that not everyone has access to the latest technology**, either at home or at school.
- **Competitions and challenges can throw up barriers** – if you do run a challenge, bring out the teamwork element and provide opportunities for everyone to be involved and rewarded.
- **Use examples and images that resonate with students** – for example, you could show that engineering is related to film, apps, computer games, sport, food, travel, the environment, fashion, health and beauty.
- **Avoid referencing engineers from history** – use contemporary examples, including women and those from minority ethnic groups.
- Get the students thinking about real-world applications of engineering and **encourage them to 'think like an engineer'** and come up with their own solutions and designs.
- When describing your own route into engineering, **make it clear that there are different routes into engineering**, for example, academic, vocational, apprenticeships – and remain impartial as to which route to follow or which institution to study at.
- Many students won't know anything about the university application process and may never have heard of an apprenticeship – **be open and encourage questions**.

CASE STUDY: SeeME

In a world where the UK needs around 200,000 engineers, technicians and apprentices each year to meet demand, it is vital that Siemens continues to highlight role models from a diverse variety of identities and backgrounds, increasing the opportunity for young people to see and recognise people like themselves in exciting and challenging careers.

SeeMe, in collaboration with Fran Scott from CBeebies, celebrates cultural, ethnic, sexual, gender and ability diversity within the STEM community. It also discusses stereotypes and misconceptions and explores some of the perceived barriers to pursuing a STEM career.

Ultimately it highlights how diverse teams are more likely to reach technological

breakthroughs and innovation through an interactive, curriculum-based online digital workshop and a demonstration-filled stage show.

SeeMe showcases real role models who share their authentic career and personal journeys demonstrating that engineering is truly inclusive and can really be done by anyone, anywhere. Just because someone isn't the best in the class at maths it doesn't mean that an engineering career is out of bounds - it is an industry where you can grow and adapt to do what you truly want to, without compromise.

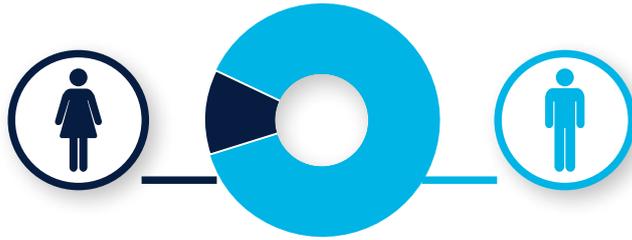
SIEMENS

[siemens.co.uk/education](https://www.siemens.co.uk/education)



Under-represented groups

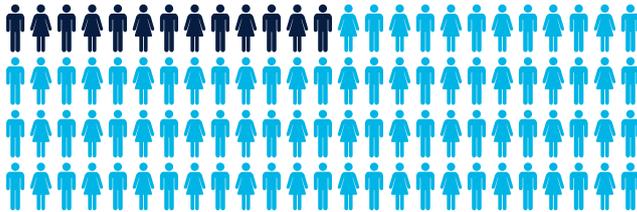
We know that several groups are under-represented in the engineering industry, such as women and certain minority ethnic groups. You can use this knowledge to inform delivery and make a conscious effort to include diverse examples and role models. However, it is generally a good idea to avoid focusing on issues of under-representation with students, who may not be aware that such issues exist and may find it off-putting or see it as a barrier to entering the profession.



Women comprise

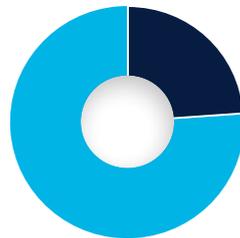
14.5%

of the engineering workforce



13.1%

of those in engineering occupations are of minority ethnic heritage



24%

of those working in engineering are from low socio-economic backgrounds

Around 9% of engineering and technology students declared that they have a disability or impairment, as compared with the average of 14% for all subjects



2020 Labour Force Survey



Measuring impact

Evaluating your session and determining the impact you have had on students' (and teachers') perceptions of engineering is really important. It helps you - and other colleagues - understand what is working well about the activity or engagement, and what needs adapting or re-working.

EngineeringUK has produced a measures bank, offering STEM engagement providers a number of example questions that can be included in, or provide inspiration for, their own programme evaluations.

tomorrowsengineers.org.uk/measures-bank



For more information about how we can support and work with you, please contact our team on:

skillpartnership@engineeringuk.com

Staying safe

A few points on safeguarding have been listed below - you should communicate with the school about these points - along with anything else your company may wish you to check - well in advance of delivering the session. STEM Learning provides useful information and resources for STEM Ambassadors going into schools.

Sign up and access resources at: stem.org.uk/stem-ambassadors

- **Find out what level of clearance you will need for being on site** – you will almost certainly need to show DBS or PVG certification if you are going to be visiting a school or youth organisation – make sure you start the application process in good time.
- **Work with the teacher on their risk assessment** for the activity – templates are likely to exist already.
- **The school will have policies** on safeguarding, photo consent and social media consent – if in doubt on the day, double-check with the responsible adult on site.
- **Due to safeguarding, you should never be left unattended with the students** – check with the school that a member of school staff will always be present.
- **Responsibility for discipline lies with the school** – you should not need (or attempt) to discipline the students yourself.
- **Any follow-up communication with the students should be done through the teacher** and personal email addresses should not be given out.
- **Check with the school** (and if you are an employee, check with your employer) what the requirements are around public liability insurance.



Preparation checklist

To make the experience as smooth and positive as possible, we have come up with a handy checklist that you can use, when preparing to deliver your activity or engagement. (Please note, this is not an exhaustive list):

- Talk to the school and share expectations about the activity. Establish the following:
 - Name and contact details for the staff member who is responsible (ensure at least one member of staff will be present throughout)
 - Access requirements for students with additional needs
 - Room size and set-up (including access to technology and special equipment)
 - Number of students and year group
 - Timings
 - Expectations for the activity/talk structure – many schools follow a set format, for example, starter, activity, plenary
 - Appropriate dress
- If you have the opportunity, find out if there are any STEM curriculum links – ask the teacher what the students are learning about this term.
- Ask whether the students are at key decision-making points – for instance they may be in the process of choosing subject options.
- Order any leaflets or resources you need in advance. If you want to order any of the free Tomorrow's Engineers careers leaflets or download the 'Engineer your future' PowerPoint presentation, go to neonfutures.org.uk/resource
- Work out logistics, such as how to get there, parking restrictions, who to report to, what to bring (such as, DBS certificate, photo ID, student worksheets, equipment and any other materials you might need).



Try to relax, be yourself and enjoy the session. Prepare as well as you can, but don't worry if things don't quite go to plan. It is unlikely that anyone will even notice, unless they knew exactly what you had planned! Every time you do it, you'll learn something new and will grow in confidence.



Useful links

Tomorrow's Engineers

Led by EngineeringUK, the Tomorrow's Engineers website brings together resources to support practitioners in getting the most out of their engagement activity

tomorrowsengineers.org.uk

EngineeringUK Skills Partnership

EngineeringUK works in partnership with companies of all sizes and in all areas of the UK to inspire more - and more diverse groups of - young people to become tomorrow's engineers.

skillspartnership@engineeringuk.com

Free engineering careers resources

neonfutures.org.uk

This is Engineering

thisisengineering.org.uk

Tomorrow's Engineers Code

The Tomorrow's Engineers Code is a commitment to work toward common goals to increase the diversity and number of young people entering engineering careers. It's free to join and any organisation within the UK that funds, designs and/or delivers STEM-inspiration activities is invited to become a Signatory

code.tomorrowsengineers.org.uk

STEM Ambassador programme

stem.org.uk/stem-ambassadors

Neon

Help teachers discover your experience or activity

neonfutures.org.uk/submit-an-experience



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