Promoting engineering and technology careers through environmental sustainability

A guide for content developers

The demand for engineering skills is growing rapidly across all industries, especially as we work towards a net zero future. It's estimated that up to 725,000 new jobs will be needed by 2030 to support this transition.[1]

Young people show a strong interest in environmental matters, especially climate change with girls demonstrating greater interest in the environment than boys[2]. Many young people are interested in a career that will help reduce climate change[3]. However, we know that employers in the engineering and technology sector are reporting skills shortages and recruitment difficulties. There is also an underrepresentation of certain groups in the workforce, particularly women. In the classroom, young people hear more about environmental problems than they do about solutions.[4]

Students recognise the value of learning about climate change and sustainability but don't necessarily find it enjoyable[5]. Most young people don't realise that most green jobs are STEM-based, rather than nature-based[6], and that engineers, technicians, and technologists play an important role in creating solutions to environmental problems.

The engineering and technology sector needs to recruit more people, and crucially, increase diversity. In schools, we must expand the content of environmental education from cause and impacts to encompass more solutions and careers. The Department for Education suggests that to raise awareness of green careers, increased awareness of mitigation and adaptation strategies is vitally important.[7] Evidence indicates that focussing on solutions helps students feel more hopeful and combats eco-anxiety.

76%
of schools are teaching students about **environmental issues**

40%
are exploring **environmental solutions**[8]

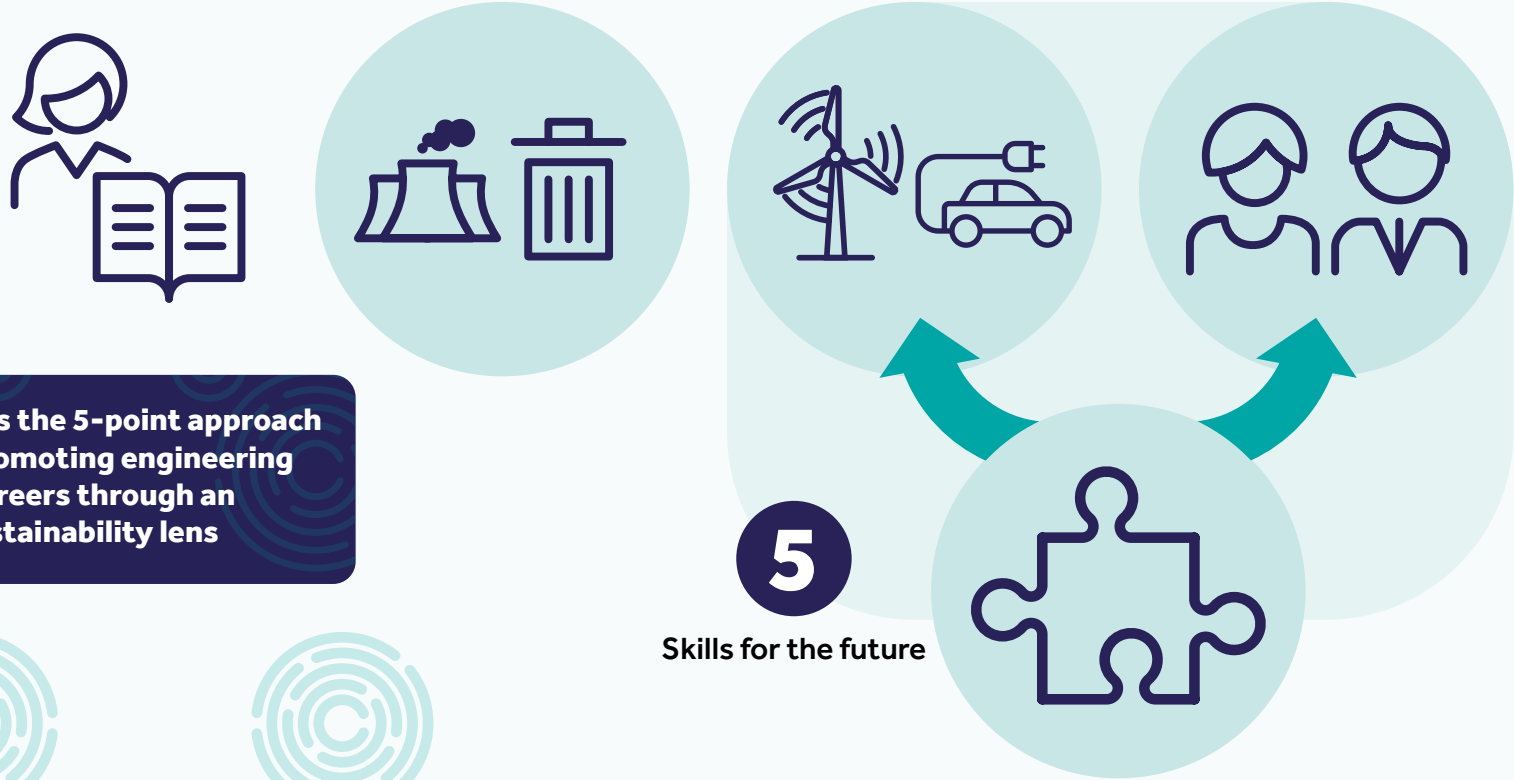
This guide explores how engagement activities can use environmental issues to inspire and motivate young people into engineering and tech career pathways when designing and delivering careers education activities and experiences.

EngineeringUK
INSPIRING FUTURES TOGETHER

1 A Net Zero Workforce (Climate Change Committee, May 2023)
2 Science Education Tracker 2023 (Verian, The Royal Society, EngineeringUK, April 2024 – Fig. 13.1)
3 Ibid (Fig. 13.4)
4 School Report 2023 (Pearson, June 2023 – p.32)
5 Climate Change and Sustainability Education: A survey of students in England (UCL, July 2024 – p.5)
6 Estimates of green jobs, UK: July 2025 (Office for National Statistics)
7 Climate literacy amongst school leavers (Dept. for Education, December 2024 – p.72)
8 School Report (Pearson, 2023)

Promoting engineering and technology careers through environmental sustainability

1. Link to curriculum
2. Identify environmental problem(s)
3. Identify engineering solutions (plus behaviour change)
4. Highlight engineering careers



5. Skills for the future

Our model outlines the 5-point approach we recommend promoting engineering and technology careers through an environmental sustainability lens

Link to the curriculum

When designing content, linking environmental sustainability to the school curriculum allows teachers to include it in their school day. It also makes the issues relevant and understandable for young people.

Solutions to environmental issues, such as climate change and biodiversity loss, don't feature explicitly in the current curriculum. However, there's still opportunities to make connections. In England, links can be made in KS3 and KS4 geography, science and D&T. The Scottish curriculum offers links in sciences, social studies and technologies at 2nd, 3rd and 4th Level. Wales and Northern Ireland's curricula also offer opportunities to make relevant links. **See Appendix 1 for more detailed information for your region.**

Environmental themes can also be used across other subjects, such as English (e.g. debates on use of climate-related language), history (e.g. of energy use), economics (e.g. carbon pricing) and computer science (e.g. tracking of biodiversity).

Additionally, all environmental issues align with the United Nations Sustainable Development Goals (UN SDGs), which some schools may already be incorporating into their curriculum.

Extra-curricular activities outside the classroom (e.g. an after-school activity) can be more flexible, and do not need to be linked to the curriculum.

Schools are likely to take an increasing interest in environmental sustainability topics. The DfE's Sustainability and Climate Change strategy[4] asks all educational settings in England to have a Climate Action Plan by 2025. These plans will need to address climate education, as well as connections to green skills and future careers.

4 Sustainability and climate change: a strategy for the education and children's services systems - GOV.UK (www.gov.uk)

Identify the environmental problem(s) to be addressed

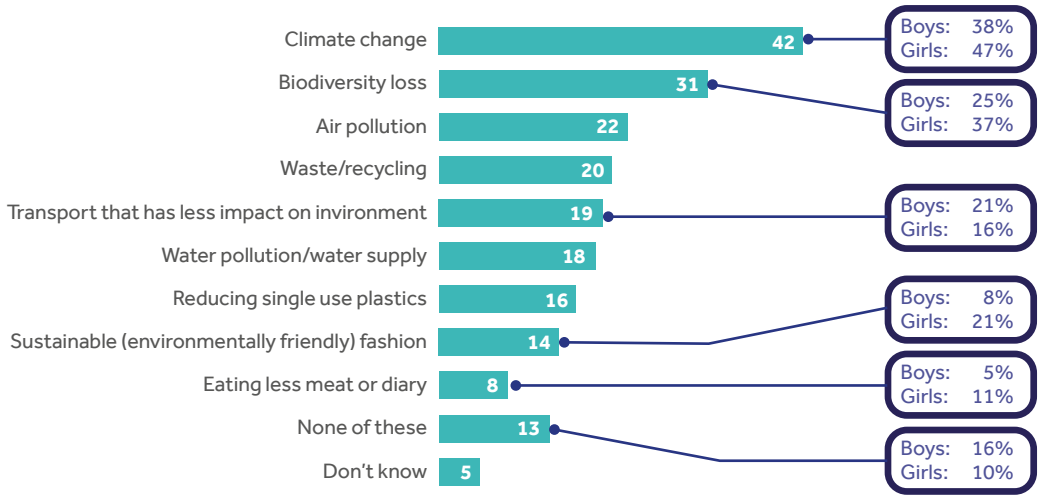
When planning engagement activities, it's important to showcase environmental issues that resonate with young people. Research suggests that girls and boys can engage with environmental issues differently. Girls tend to show more interest and are more consistent in their engagement with climate change topics throughout school.

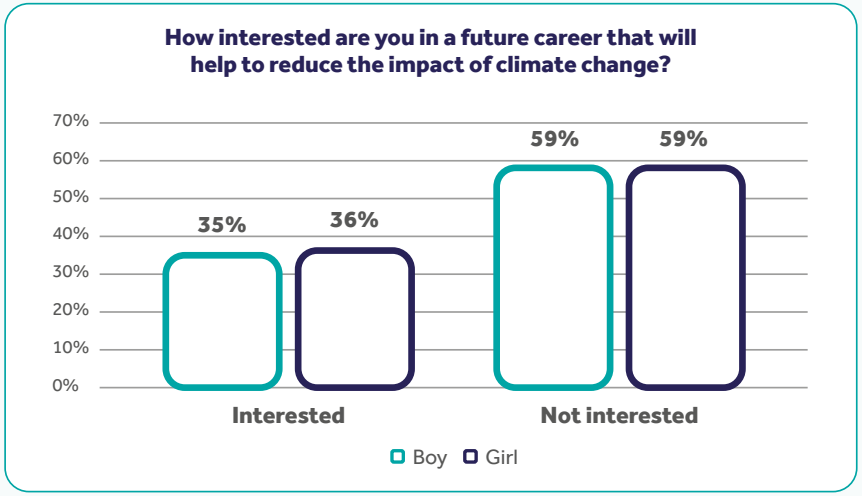
When it comes to choosing a career in tackling climate change, there appears to be no difference between the interest of boys and girls (35% of students). You can also consider topics that align with young people's experiences and local contexts. For instance, research indicates that students in rural areas of England are particularly interested in biodiversity, while those in London show above-average interest in air pollution.

Interestingly, boys are more likely than girls to be motivated by pay, while girls are more likely to be incentivised by a desire to help people or society.[5]

Figure 13:1 Level of interest in topics related to the environment among year 7-13 students by gender (2023)

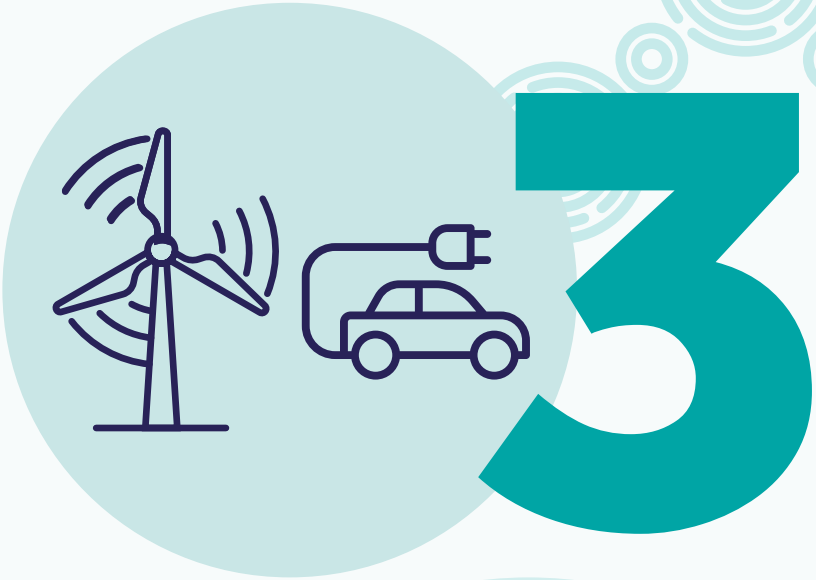
% of all year 7-13s interested in topics related to the environment





5 'Science Education Tracker 2023' (Verian, The Royal Society, EngineeringUK, April 2024, p.139)

Identify the engineering and technology solutions



In the content, it's important to explain what engineers and technicians do, as many students may not know.

To explain, you can showcase the real-life impact that engineering and technology careers will have in addressing sustainability challenges. Reaching net zero by 2050 means that lots of sectors need to innovate and change. This transition relies on both expanding existing engineering solutions and introducing new technologies. For example, wind power will need to expand and become more efficient, and we may adopt new innovations such as sustainable aviation fuel and direct air capture of carbon dioxide.

There's lots of options you could showcase – we recommend focusing on a familiar topic (e.g. wind farms or electric vehicles) alongside a less common but exciting subject (e.g. vertical farming). Inspiring examples of solutions can be motivating for students to find out more about engineering and technology, as well as helping address eco anxiety. **See Appendix 2 for more examples of engineering & technology solutions to sustainability problems.**

Behavioural changes, such as reducing meat and dairy consumption, will also play an important part in reducing our impact. These behavioural aspects deserve emphasis alongside technological innovations.

Engaging classroom resources can support your outreach. Our team has developed exciting and inspiring posters and postcards centered around environmental themes, spanning topics from food to transportation. The resources are linked to many of the UN Sustainable Development Goals and are excellent conversation starters for classroom discussions.

You can download or order them free of charge on Neon: www.neonfutures.org.uk/resources

Highlight careers linked to engineering and technology solutions

From the ages of 11 to 14, young people will start to consider their skills and interests and their future career paths.

There are lots of different pathways into engineering and technology careers, e.g. T Levels, apprenticeships, degree apprenticeships and university degrees. It's important to showcase the diversity of routes in your activity, which will support Gatsby Benchmark 7, 'Addressing the needs of each pupil'.

By linking environmental solutions to the curriculum and future careers, you will also support schools to meet Gatsby Benchmark 4 'Linking curriculum learning to careers'.

There's a role in engineering for everyone – don't forget to include information about growth industries, salaries, what engineers do, current workforce diversity and ethics.

- **Around 20% of all UK jobs are in engineering**
- **Engineering and technology jobs are predicated to grow in all UK regions between now and 2030 – faster than other occupations**
- **Advertised salaries in engineering (£38,600) are almost 30% higher than the national average of all occupations (£30,000)[6]**
- **For specialist roles and experienced Chartered Engineers, salaries can exceed £80,000[7]**

Outreach activities should include diverse examples of role models: real, relatable young people in green engineering and technology from both academic and technical pathways. Short videos (under 90 seconds long) keep students engaged and excited.

A diverse range of young, real engineers can be found on:

- **www.eukeducation.org.uk/resources/real-jobs**
- **www.thisisengineering.org.uk**

Share Neon resources with teachers to help make the link to engineering careers. Get information on future skills needs, different routes into engineering and more. The resources are perfect to share with parents/carers at options evenings, careers events and with students considering their future careers.

www.neonfutures.org.uk/future-skills

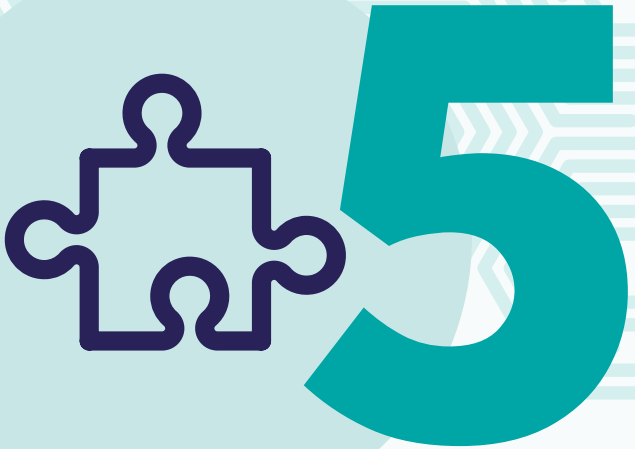
6 'Engineering skills needs – now and into the future' (EngineeringUK, Lightcast, p.28)
7 www.checkasalary.co.uk

Skills for the future

Engineers and technicians use their skills to improve the design and performance of everything we use today and to develop the products and technologies of the future. Future engineers will need to be able to handle complex information, embrace change and be inclusive and ethical.

Engineering skills are highly transferable and will always be in demand. Created from research led by the Royal Academy of Engineering[8], we showcase 8 skills on Neon careers resources to help young people understand sought after skills in engineering and technology. Outreach content should be designed to ensure young people develop these skills, whilst celebrating the skills that they already have.

Outreach activities could encourage students to identify the skills needed for specific green careers and reflect on when they have used these skills in the past. Research shows that enjoying practical work was the top reason for feeling encouraged to learn science, so offering hands-on experiences will also help engagement. [9]



8 'Thinking like an engineer: Implications for the education system'
9 'Science Education Tracker 2023' (Verian, The Royal Society, EngineeringUK, April 2024)

Helpful tips

When designing careers education activities and experiences, there are a few things to think about. Read our checklist to support you further, and consider the following suggestions when discussing green engineering and technology careers with students:

- **Make it fun:** Research found that students recognise the value of learning about climate change and sustainability, but they don't necessarily enjoy it[1]
- **Diverse careers:** many sectors in the UK need to improve to help meet net zero (e.g. agriculture, housing, aviation, waste and recycling), so there are plenty of sectors to work in
- **Engineering is international:** lots of countries face similar environmental issues to the UK. Careers in engineering and technology can be international, and people with these skills and experience will be in demand
- **Language:** take care with your words. Choose commonly understood terms - flying instead of aviation, and farming instead of agriculture
- **Relevance:** include examples that resonate with the experiences of young people. Account for a variety of interests, life experiences and local geographies, whilst using inclusive messaging
- **Shared responsibility:** avoid suggesting or implying that the world's environmental problems are down to the students' generation to solve
- **Precision:** replace vague terms like "more sustainable" (often used when "less damaging to the environment" would be more accurate) with specific descriptions. Remember that sustainability is binary - either a process is sustainable, or it isn't
- **Independent verification:** if you can, get independent validation for engagement materials, for example by the Royal Meteorological Society

Get further support with resources available on EngineeringUK:

- **Discover the Environmental Sustainability: Classroom Content Maturity Checklist**
- **Read the Getting the Message Across guide to get more general support when you're developing or delivering engineering outreach activities**

1 Climate Change and Sustainability Education: A survey of students in England (UCL, July 2024), p5