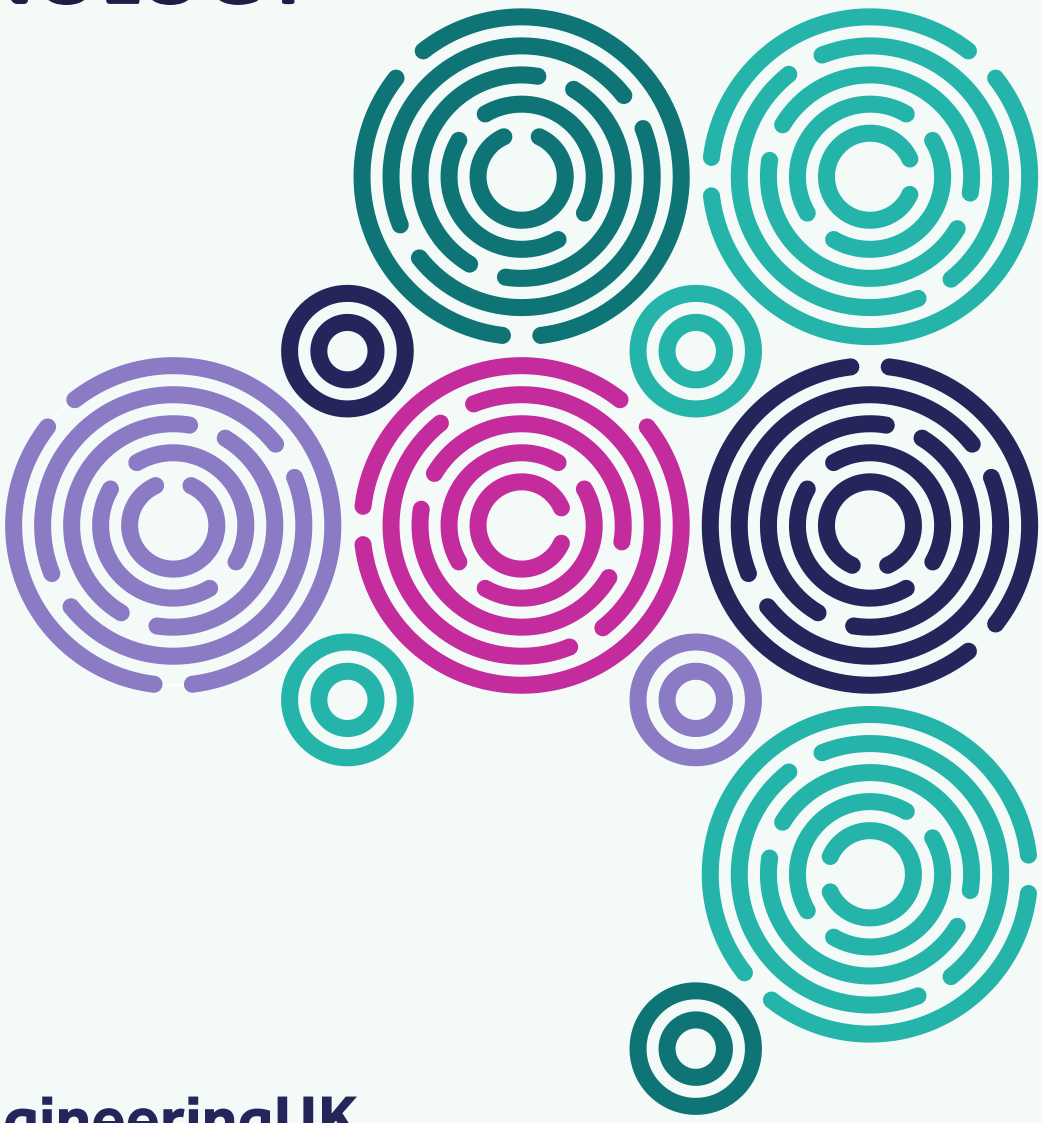
SHAPING SCOTLAND'S SCIENCES CURRICULUM: PREPARING YOUNG PEOPLE FOR FUTURE CAREERS IN ENGINEERING AND TECHNOLOGY



EngineeringUK
INSPIRING FUTURES TOGETHER

engineeringuk.com

Contents

Introduction

Scotland's sciences curriculum is undergoing significant change. This presents an opportunity to design science education in a way that will better prepare young people for engineering and technology careers.

EngineeringUK co-hosted a roundtable with Education Scotland, the Scottish Government agency leading the review of the Curriculum for Excellence (CfE). The purpose of this roundtable was to bring engineering and technology industry perspectives into the early stages of Scotland's sciences curriculum reform.

We brought together representatives from 11 employer organisations spanning Scotland's engineering and technology sectors, including energy, infrastructure, construction and critical technologies.

While the focus for this discussion was Scotland, many of the priorities identified can also be applied to the English context, whilst acknowledging differences in demography and the existing policy landscape for the school curriculum.

Scotland's Curriculum Improvement Cycle: a golden opportunity

Scotland's curriculum review marks the first iteration of the new 10-year Curriculum Improvement Cycle (CIC),[1] introduced following the Organisation for Economic Cooperation and Development's (OECD) 2021 recommendation for a more systematic approach to curriculum reform.[2] It is the first substantial update since Scotland's CfE was introduced in 2009 and will shape learning through to 2038.

It is therefore an important moment to create stronger connections between learning and work. The curriculum reform is taking place alongside qualification and assessment reform[3] and wider shifts in the Scottish skills landscape.[4] This presents an opportunity to establish greater coherence across the full primary and secondary school system, and beyond into the workplace.

[1] Education Scotland webpage: Scotland's Curriculum Framework, Curriculum Improvement Cycle (accessed 28/01/2026)
[2] OECD, Scotland's Curriculum for Excellence: Into the Future, Implementing Education Policies, (2021)
[3] Scottish government webpage: Curriculum, Qualifications and Assessment Reform: progress to date and next steps, published June 2025 (accessed 28/01/2026)
[4] Scottish Parliament webpage: Tertiary Education and Training (Funding and Governance) (Scotland) Bill, bill introduced February 2025 (accessed 28/01/2026)

Approach of the review – and opportunities for engineering

Education Scotland is taking a "big ideas" approach to science curriculum reform, focusing on the overarching and enduring understanding that they want children to develop. Initial thinking is forming around big ideas for sciences that promote understanding of:

- what it means to be scientific
- the scope of scientific knowledge and what we know so far
- how we put science into action to improve lives and to help people and planet

The process of curriculum reform creates scope to strengthen the place of engineering in Scotland's curriculum. This will be decided by Scotland's educators, who are shaping the process of curriculum reform through a service-design approach.

Engineering underpins some of Scotland's most exciting core sectors, including space, life and chemical sciences and green technologies. Ensuring these links are visible to learners, and making engineering explicit across disciplines, can also help learners connect scientific principles to modern roles and national priorities such as net zero.

Roundtable insights

The roundtable was framed around three overarching sections:

- **priority knowledge and skills** - defining the essential science skills and knowledge for success in engineering and technology careers and identifying gaps in work-readiness
- **building a future-oriented sciences curriculum** - ensuring the sciences curriculum reflects emerging technologies and real-world engineering challenges
- **industry's role in the curriculum** - exploring how employers can support educators to engage learners and link curriculum to future careers in engineering and technology

The following sections summarise the insights from the discussion.

Priority knowledge and skills

Theme 1: Developing transferable and meta skills

Employers stressed that the curriculum must focus more on developing transferrable skills, to ensure that young people are adaptable and resilient for diverse, evolving careers.

Global employment trends signal the creation of 170 million new roles and the displacement of 92 million existing positions by 2030.[5]

In this context, communication, systems thinking and the ability to collaborate and build trust were considered as essential as technical skills, given the uncertainty of future technical demands and shifting labour markets.

Work-readiness was also highlighted as a concern. Common challenges include time management, reliability and confidence in communicating with colleagues. Participants suggested that starting to develop these skills earlier in the learning journey could help young people transition more smoothly into employment.

Theme 2: Encouraging innovation & creativity

Employers emphasised that creativity underpins the problem solving required in engineering and technology. Despite this, they reported difficulty finding candidates with strong creative and innovative skills - even in high growth sectors such as space. Participants noted that confidence in creative problem-solving can decline throughout schooling, when it should be strengthened.

In an age of artificial intelligence, the curriculum must also encourage young people to challenge sources, develop critical thinking and not necessarily accept the first answer they encounter, fostering information evaluation skills.

It was suggested that adopting a "STEAM" (Science, Technology, Engineering, Arts and Mathematics) framing could more explicitly embrace the creative aspects of science and technology.

Theme 3: Bridging the maths and sciences curricula

Numeracy is both essential to support scientific understanding and a barrier for many learners. It was noted that disengagement from science can begin when learners lose confidence in maths. This means that even a strong sciences curriculum risks being diluted if students are put off by the mathematical elements required to access it.

Education Scotland's maths and sciences curriculum teams have collaborated throughout this process, and employers highlighted that ongoing collaboration will be essential to address the longstanding disconnect between the two disciplines.

Employers also recommended teaching more core technical skills that draw on mathematical understanding, such as data analytics, cyber security and basic software tools.

[5] World Economic Forum, Future of Jobs Report 2025, (2025)

Summary of discussion on priority knowledge and skills:

- transferable and meta skills are as important as technical knowledge in a rapidly changing labour market
- build work-readiness skills earlier in the learning journey to support young people to transition more smoothly into apprenticeships and entry-level roles
- nurture creativity and innovative thinking throughout STEM, whilst supporting learners to challenge sources and think critically
- strengthen maths–science alignment to support confidence in maths and understanding of the relevance of numeracy to scientific and engineering pathways

Building a future-oriented sciences curriculum

Theme 4: Demystifying engineering

Participants stressed that the revised curriculum should demystify and elevate engineering and broaden its appeal. It should be presented as a discipline with social impact and diverse career opportunities. Examples such as Formula 1, space exploration and green energy innovation were highlighted as powerful ways to engage young people. Such examples can also demonstrate engineering's role in addressing major national priorities like net zero.

Employers also noted that the separation of sciences into biology, chemistry and physics can create siloes and limit learners' ability to make connections across disciplines. Education Scotland's proposal to adopt shared "big ideas" across physics, chemistry and biology (as opposed to distinct big ideas for each science) was welcomed. It was suggested that this could be used as a potential framing approach to better position engineering as an integrative discipline and boost its visibility.

Curriculum design should explore how to bring engineering into the classroom in ways that go beyond generic STEM engagement. Employers highlighted the challenge of retaining talent when expectations don't align with the realities of engineering work. For example, some reported losing site-based apprentices to office-based roles. Preparing young people for these realities is important. Education Scotland noted that outdoor learning, which is an entitlement for learners in Scotland, can play an important role by mirroring these real working environments.[6] Embedding practical tasks and tactile learning opportunities was also seen as key to challenging preconceived understanding.

[6] Education Scotland webpage, Learning for Sustainability advice and guidance: Outdoor learning, (accessed 28/01/2026)

Theme 5: Linking the classroom to real-world careers

It was agreed that the curriculum must draw a more direct line between classroom learning and real-world applications. Without this, learners may not understand how STEM subjects translate into meaningful career opportunities.

Employers highlighted inconsistencies between classroom and industry terminology. It was felt that introducing engineering language and concepts from an earlier age could strengthen links between curriculum and work. It was also suggested that practical approaches, such as using occupational maps to show how scientific principles underpin different engineering roles, could further strengthen these links.

Scotland's Curriculum Improvement Cycle may create opportunities to strengthen interdisciplinary approaches and education pedagogies such as project-based learning. Employers agreed on the value of projects that are explicitly aligned with real-world contexts. These can be co-designed with industry to ensure authentic engineering challenges that connect scientific principles to real situations.

Theme 6: Embed equity in curriculum design

Widening participation in engineering is critical to meeting future workforce needs, as participants from various sectors noted. For example, the nuclear industry forecasts the need for 100,000 additional workers across the UK by 2030.

Attracting women and other underrepresented groups into engineering and technology careers will be essential, and the sciences curriculum should challenge stereotypes and inspire all young people. It was suggested that emphasising the creative and diverse skills required within engineering and technology could help shift gendered perceptions. This could help to demonstrate, for example, that the sector demands a broader skillset than hands on, mechanical work.

Neurodivergent learners were also discussed and that rigid assessment formats can create challenges for neurodiverse students. It was noted that these difficulties can persist into recruitment processes, with some struggling in traditional interview or assessment centre settings.

Meanwhile, in terms of geographic equity, learners in rural and remote communities may have limited access to employer engagement and STEM enrichment. Scotland has large clusters of engineering firms around Edinburgh, Glasgow and Aberdeen for example, but students in more isolated areas may face challenges when accessing STEM employers. It was suggested that nationally coordinated remote engagement models, such as virtual mentoring, online workshops and project kits could help. At the same time, it is important to maintain flexibility for schools to adapt resources to local contexts.

Theme 7: Agility within the curriculum

The curriculum must be agile enough to keep pace with rapid technological change. Emerging technologies, particularly AI, are a major driver of change and participants felt that their full impact is not yet understood. Drawing on experience from apprenticeship and T Level approval groups in England, concerns were raised that lengthy development processes could result in outdated content by the time it reaches classrooms.

Participants recommended structured, ongoing feedback loops between Education Scotland and industry, to ensure that subject content remains current and reflects evolving workplace technologies.

The future curriculum should also prioritise strong scientific fundamentals, rather than training for narrowly defined roles that may not exist in the future. Learners need to understand why core principles matter and be able to apply them in new, real-world contexts.

Summary of discussion on building a future-oriented sciences curriculum:

- curriculum should seek to demystify and elevate engineering, showing its breadth and connection to national priorities
- link learning to careers through breaking down disciplinary siloes in science and introducing engineering terminology, concepts and occupational maps
- embed equity into curriculum design so that all learners feel inspired and enabled to succeed in engineering and have consistent access to high-quality STEM enrichment
- ensure that the curriculum remains agile, by embedding feedback loops with industry and enabling learners to apply core scientific principles to emerging technology and real-world contexts

Industry's role in the curriculum

Theme 8: Enable targeted, data-driven support

Education Scotland has a national overview of Scotland's curriculum and can identify areas of need in the curriculum where further resources or professional learning are required. Participants suggested sharing these areas of need with industry, so that employers can develop targeted resources and support for teachers.

Some proposed that the Scottish Government could facilitate this through structured call-outs for industry contributions and resources linked to specific learning needs. Employers expressed interest in participating in planned engagement programmes, allowing for strategic planning rather than ad-hoc engagement. Scheduled opportunities for engagement could also support SMEs, who may struggle to engage with schools on a regular basis due to capacity.

Theme 9: National coordination of industry-supported STEM education

Participants highlighted the need for a more embedded and consistent national approach to industry support for STEM education. This includes not only the provision of resources and activities, but also initiatives that help to raise aspirations among young people.

It was noted that although employers produce a lot of high-quality teaching resources and outreach activities, these are often fragmented across multiple platforms and networks. This can make it more difficult for teachers to access them, particularly in schools with limited time or capacity.

Participants suggested that a national platform designed for teachers, containing industry-supported STEM resources and activities, could be beneficial. Such a platform would allow Education Scotland to aggregate, quality check and ensure that these resources are made accessible to all schools. This would give schools a single, reliable point of access to employer-developed support, allowing teachers to engage with high-quality materials and deliver them confidently to learners.

Such an approach would also help ensure that employer support reaches learners regardless of where they live or which businesses operate locally. For example, a centrally coordinated database of opportunities for engagement with schools could be made available for employers. It was felt that this would also enable greater participation from SMEs.

Participants also emphasised the importance of leveraging existing networks that bring together employers and education settings, such as Developing the Young Workforce (DYW) and the STEM Ambassador Programme.

Theme 10: Support for teachers

Finally, employers emphasised the need for nationally rolled-out professional learning to support all teachers to use industry-aligned STEM resources confidently and effectively. This could, for example, include training on how to integrate these resources into lessons and examples of best practice.

Summary of discussion on how to maximise industry's role:

- use national data to target industry-produced resources at clearly defined curriculum "touchpoints," and facilitate structured, planned engagement programmes
- develop a coordinated national approach for employer-supported STEM resources and school-industry engagement, ensuring quality, accessibility and consistent reach across all schools
- provide nationally rolled-out professional learning to support teachers to use industry-aligned STEM resources confidently and effectively

Conclusion - next steps and ongoing discussion

The engineering and technology sectors underpin major national ambitions, including driving economic growth and improving sustainability. The UK government has recognised that there are acute skills shortages across the priority sectors outlined in the UK-wide Industrial Strategy (IS-8). In response, it has set ambitious long-term targets for investment, growth and skills.

Whilst reskilling and lifelong learning have an important role to play, they cannot meet all current and future workforce demands. Much of this demand in these growth-driving sectors will be met by new engineering and technology recruits, most of whom are currently of school age. Scotland's sciences curriculum reform therefore presents a significant opportunity to equip young people with the knowledge, skills and confidence to thrive in evolving engineering and technology sectors. It can also help close persistent skills gaps.

Industry engagement with the education system will be critical to achieving these goals. This engagement can help ensure that the curriculum enables learners to develop the knowledge and skills needed for the future workforce. Employers offer valuable, up-to-date insight into evolving workforce needs and can help align learning with real-world opportunities.

Shared priorities across nations

Many of the themes emerging from the discussion mirror evidence and recommendations that EngineeringUK submitted to England's Curriculum and Assessment review (CAR).[7]

This includes the need to declutter science content, to create space for high-quality practical learning and to consistently embed cross-curricular themes, such as digital literacy and sustainability, across STEM subjects.

Both EngineeringUK's research and Education Scotland's findings emphasise the importance of connecting learning to real-life work. Education Scotland, for example, found that this is critical to reducing barriers to STEM engagement amongst young people.[8] Without it, STEM - and engineering - can feel abstract. To address this, EngineeringUK has called for the Department for Education (DfE) to fully embed careers education within STEM subject content. This follows research showing inconsistencies in STEM-focused careers provision in schools and colleges across England.[9]

Improving the gender balance in the engineering workforce is another shared challenge across the nations - and one that participants acknowledged begins at school. Currently only 16.9% of the UK engineering and technology workforce are women, compared to 56% of the wider workforce.[10]

[7] EngineeringUK, Curriculum and Assessment Review consultation response, (2024)
[8] Eskogen, The Structural Barriers to STEM Engagement, (2022)
[9] EngineeringUK, Advancing STEM careers provision in England, (2024)
[10] EngineeringUK, Women in engineering and tech dashboard (Sept 2025)

We also know that, in England, girls are disengaging from science at an early age, with a 10-percentage point drop in interest among 11 to 14-year-olds between 2019-2023.[11]

Closing this gender gap - and increasing participation from all under-represented groups - is an ambition shared across both nations. EngineeringUK is a leading partner of the Gender Pathways Collective, which aims to create a step change in the number of girls pursuing engineering and technology pathways. Our evidence highlights the need for curriculum activities that challenge gender stereotypes around engineering and technology. Children begin to associate certain careers with gender at a young age. These early perceptions can shape their attitudes and beliefs about what they are capable of and what career paths are available to them.[12]

Coordinating access to industry-produced STEM resources and enrichment activities is another shared priority. Participants in the roundtable suggested a national platform and database to aggregate and quality-check industry-supported resources and engagement opportunities, ensuring equitable access for all schools. EngineeringUK's NEON platform provides a strong example of how curated, accessible resources can support teachers and widen reach.

Finally, teacher professional development has been highlighted as critical in both nations. EngineeringUK has long recognised its importance and called for additional continuous professional development (CPD) for STEM teachers in England. STEM Learning's analysis shows that science-specific CPD increases teacher retention significantly - from 1 in 12 leaving the profession to 1 in 30.[13] Investing in CPD will support effective delivery of the new curriculum, high-quality learning outcomes, and a motivated teaching workforce.

Both Scotland and England are in the midst of significant curriculum reform, creating a valuable opportunity to share evidence and approaches. This roundtable captured employer insights and practical recommendations that can help shape clearer, UK wide pathways into engineering and technology.

[11] EngineeringUK and The Royal Society, Science Education Tracker, (2024)
[12] EngineeringUK, Rapid evidence review, Interventions to increase girls' aspirations for engineering and technology careers, (2023)
[13] STEM Learning, The Impact of STEM Learning Science CPD, (2023)

Annex A

Next steps

Education Scotland will establish a ‘critical friends’ group to enable ongoing industry input through the development phase to mid-2026. From 2026–2028, resourcing and implementation will focus on teacher professional learning and embedding project-based, real-world engineering challenges. These are areas where EngineeringUK and employer partners are invited to continue to collaborate to ensure that learners encounter authentic engineering contexts from the outset.

The roundtable highlighted a shared ambition across education and industry in Scotland to create a curriculum that is agile and future-focused, inclusive, and demonstrates real-world application. It also laid the foundations for continued collaboration with the engineering sector in shaping the sciences curriculum.