



ASSOCIATION FOR
SCIENCE EDUCATION



Pledges for the next government

ASSOCIATION FOR
SCIENCE EDUCATION 2024

Four election pledges to help transform science education for a brighter future

In an era where humanity faces a multitude of existential threats - from climate change and biodiversity loss to the looming spectre of pandemics - the importance of robust science education cannot be overstated. If we are to arm the next generation with the tools and knowledge to confront these challenges, foster innovation for future scientific breakthroughs, or simply help people to live well and make healthy choices, we must ensure sound foundations are in place to ensure equal access for all to a good science education.

Our four asks in brief

1. National review of the vision for science education.
2. Reform of the science education curriculum and assessment.
3. Increased funding to support training and ongoing professional development.
4. Support for equity and inclusion initiatives that help to ensure all young people have equal access to excellent science education.

A good science education is reliant on:

- An authoritative educational curriculum, which is responsive to, and connected with, modern societal needs;
- Well qualified, highly valued, motivated and inspirational science teachers, leaders and other educators who are passionate and knowledgeable about their subject; and,
- Well-funded digital resources, and well equipped and safe science laboratory facilities for hands on practical science.

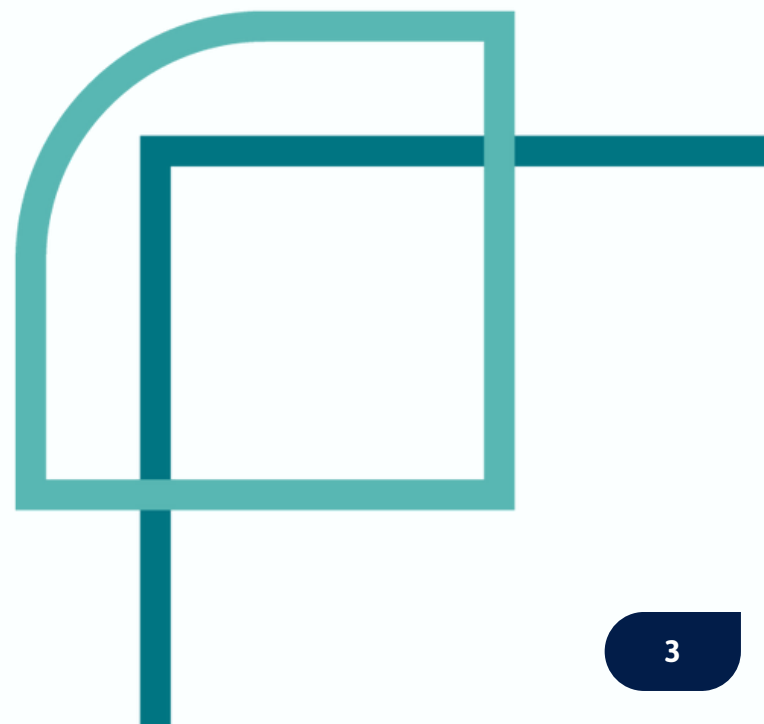
The importance of science educators

Science teachers, technicians and other science educators play a vital role in shaping the future of our society by inspiring and equipping the next generation of scientists, innovators, and informed citizens. They are not only conveyors of scientific knowledge and skills but also mentors, guides, and role models who foster curiosity, critical thinking, and a passion for discovery. Science educators ignite the spark of curiosity that drives students to explore the wonders of the natural world, understand complex scientific concepts, and develop the skills and attitudes needed to tackle real-world challenges.

To fulfil this crucial role effectively, our science education workforce must be well-supported and valued as professionals. They require access to ongoing professional learning and development, resources, and support networks to stay abreast of advancements in their field and to continually enhance their teaching practices.

By recognising and prioritising the importance of science education and investing in the well-being and professional development of science teachers and technicians, we can ensure that future generations are equipped with the scientific literacy and skills needed to thrive in an increasingly complex and interconnected world.

However, there are numerous challenges facing our schools and science education workforce that must be addressed if science education in the UK is to offer a brighter future for the next generation.



The challenges facing the science education sector in the UK

Outdated and content heavy curriculum

Whilst curriculum reform is taking place in Wales and Scotland, the national curriculum in England has not been reviewed over the last ten years, and is outdated in many respects[1]. It is content heavy, prioritises rote memorisation over critical thinking, problem solving and practical skills and discourages cross-disciplinary exploration. This is compounded by an overreliance on testing for external accountability at key stage 4 (GCSE level) and post 16 (A levels and equivalents), which fosters a culture of “teach to the test” where educators prioritise exam technique over deep understanding and application of knowledge. This approach can exacerbate inequities in educational outcomes and stifle creativity and innovation.

Recruitment

The UK is consistently failing to attract science graduates into teaching. In 2022/23 in England just 54%[2] of the target for postgraduate trainees for secondary STEM subjects was met and only 17% of the target for secondary physics teachers. This falls significantly below the numbers needed to fill science teaching vacancies in schools and raises serious concerns about our ability to deliver good science education to future generations.

Retention

29% of science teachers report that they plan to leave their role within the next five years. 18% say this is for reasons other than age or retirement[3]. The numbers of science technicians leaving the profession is also increasing[4]. Problems with recruitment and retention are not attributable to salary alone: lack of status, professional autonomy, workload leading to stress and burnout as well as a lack of subject specific learning and development opportunities are all contributing factors to the retention crisis.

[1] <https://www.gov.uk/government/collections/national-curriculum>

[2] [Initial Teacher Training Census, Academic year 2022/23 – Explore education statistics – GOV.UK \(explore-education-statistics.service.gov.uk\)](https://www.gov.uk/government/collections/initial-teacher-training-census)

[3] <https://www.rsc.org/policy-evidence-campaigns/chemistry-education/education-reports-surveys-campaigns/the-science-teaching-survey/2022/burnout-and-workload/#how-long-left>

[4] <https://www.rsc.org/policy-evidence-campaigns/chemistry-education/education-reports-surveys-campaigns/school-science-technicians/> and <https://www.preproom.org/downloads/2024-UK-School-and-College-Technician-Survey.pdf>

Specialist scientific knowledge

There is now an unprecedented and severe lack of specialist science teachers with current science industry knowledge[5]. This means young people are being taught physics and chemistry by biology or maths teachers or by those teachers with no science or maths background at all.

Access to professional development opportunities

Teachers and technicians need to keep pace with new technological advancements, scientific knowledge, pedagogical approaches and accepted best practice – but access, funding and time off to attend affordable, high quality professional development is limited.

Inequity and exclusion

There are often disparities in science education and attainment among different schools and communities. Evidence shows a correlation between socio-economic disadvantage and less engagement and attainment in STEM subjects[6]. Low socio-economic status is also associated with less well-equipped laboratories and digital resources, and lower availability of well qualified science teachers [6]. This can result in certain groups of students being left behind in, leading to social and economic disparities in STEM fields.

[5] See for example RSC survey [here](https://www.rsc.org/news-events/articles/2023/feb/the-teaching-survey-2022). <https://www.rsc.org/news-events/articles/2023/feb/the-teaching-survey-2022>

[6] Eg see [Data \(stem.org.uk\)](https://www.stem.org.uk) and Royal Society Review of [SES and Science Learning in Formal Education Settings](#).

ASE's four electoral asks of the next government

The challenges outlined above show no signs of dissipating and will only be addressed by fundamental reform of science education.

1. National review of the vision for science education

We call on the next government to undertake a comprehensive national review of science education led by an independent body, inclusive of diverse perspectives from across the education sector.

An overarching review of science education and the roles of educators within it, is long overdue and much needed in the post-COVID, net zero world. Evolving technologies, such as digital learning tools and online resources, coupled with a renewed emphasis on evidence-informed, effective pedagogies have significant potential to reshape science education practices, and will lead to teaching methods that can better meet the needs of diverse learners.

Any independent review must assess the current state of science education, define the desired outcomes for students, evaluate the effectiveness of teaching methods and identify existing challenges.

It should lay the foundation for evidence-based decision-making regarding teacher training, professional development, and curriculum design and assessment.

2. Reform of the science education curriculum and assessment

Utilising the insights from the national review, we urge the next government to seek substantial reforms to the science education curriculum and assessment.

The curriculum should prioritise critical thinking, inquiry-based learning, scientific numeracy and literacy plus data and digital competencies alongside explicit teaching of scientific content knowledge. Emphasis must be placed on incorporating climate education and sustainability into the curriculum to address pressing global challenges. We advocate for a broader vision of science education that equips students with skills, attitudes, and values to be well-rounded global citizens, as well as contributing to the STEM workforce.

We need to rely less on high stakes testing Key Stage 4 (KS4) and post 16, and move towards more assessment practices that prioritise and nurture critical thinking and problem-solving.

League tables, Ofsted outcomes and Progress 8 scores can lead to a lack of autonomy, and potentially poor student outcomes. Accountability measures should prioritise holistic student development over data-centric approaches, empowering educators to focus on meaningful learning outcomes to meet the learning needs of different students.

The ASE supports the introduction of single route science at KS4, which retain the identities of the individual sciences as per the current triple science model. According to Shift Learning's Science Timetable Models Research[7].

According to the research by Shift Learning 'Science Timetable Models', a compulsory single route for science at KS4 would:

- Support the more effective deployment of specialist teachers.
- Ensure a clearer identity of the three science disciplines.
- Provide separate grades for students, worth two thirds of a GCSE grade for each science.
- Better support students' awareness and confidence in the individual disciplines enabling improvements in attainment and progression.

[7] <https://www.iop.org/sites/default/files/2019-06/shift-learning-science-timetable-models-research.pdf>

3. Increased funding to support training and ongoing professional development

Urgent measures are needed to address and reverse the tide of dwindling recruitment and support those entering the profession. The next government must take urgent steps to elevate the status of science education professionals, placing their well-being and ongoing development at the forefront of the education agenda. This means providing tangible support, starting with a commitment to allocate 35 hours annually for subject-specific professional learning and development to enhance their pedagogical content knowledge and teaching efficacy. Access to training and support should be barrier-free, with full financial and logistical backing. Adequate funding and support should be provided to address workload concerns, behaviour management and technological needs in schools.

4. Support for equity and inclusion initiatives that help to ensure all young people have equal access to excellent science education

Addressing inequity and inclusion in schools is a critical aspect of ensuring a fair and just education system. All students should have equal access to quality education regardless of their background or circumstances.

Too often young people who attend schools in deprived areas, are left behind due to disparities in the system.

More funding is needed to create a level playing field for schools in deprived areas: both in terms of providing professional development (which ASE provides to its members) and through classroom resources and science equipment (members can access a wealth of resources through ASE).

Early identification and support for students with additional needs, bridging the digital divide, and tackling behavioural challenges must also be addressed to create inclusive learning environments.

About the ASE

The Association for Science Education (ASE) is an active membership body that has been supporting all those involved in science education from pre-school to higher education for over 100 years; members include teachers, technicians, teacher educators, researchers and others involved in science education.

We play a significant role in promoting excellence in teaching and learning of science in schools and colleges. Working closely with the science professional bodies, industry and business, we provide a UK-wide network bringing together individuals and organisations to share ideas and tackle challenges in science teaching, develop resources and foster high quality Continuing Professional Development.

We are a Registered Charity with a Royal Charter, owned by our members and independent of government. We seek to create a powerful voice for science education professionals in order to make a positive and influential difference to the teaching and learning of science throughout the UK and further afield.

The ASE's role in science education policy

We seek to shape and inform national science education policy to achieve curriculum reforms that meet young people's far-reaching needs in a complex and changing world; whilst driving a policy and practical framework that supports science educators, encourages them to stay in practice and helps them to bring about improved educational outcomes.



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The Association for Science Education

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