IOP Institute of Physics
Scotland

Scottish local authority elections 2022

Our policy priorities

Physics is fundamental to our health, wealth, security and social advancement. It has delivered the technology to power our communities, connect our lives digitally, and traverse and even escape the Solar System. It played a crucial role in the remarkable collaborative scientific response which is helping us move beyond the COVID-19 pandemic. And we will need it to develop sustainable solutions to the global climate crisis, to create tomorrow's problem solvers and innovators, and make Scotland fit for a new industrial era of science, technology and engineering. Physics can inspire people through their education, into their working lives, and as informed and engaged citizens.

Councils have an important role to play in unlocking this potential and shaping a brighter future. We're calling on all authorities and political parties to commit to the following priorities to support and grow our physics community, and so put Scotland in the strongest position to boost economic growth, create skilled jobs, and improve our quality of life.

Physics has helped tackle COVID-19

- *X-ray imaging of the virus led to the astonishing vaccination programme*
- *Fluid mechanics informed the value of distancing and face coverings*
- *GPS technology enabled the tracing of contact exposure*
- *Semiconductors powered remote working, family contact and essential service delivery – including virtual council meetings and public engagement*

Priorities for action

1. Ensure every child can receive a high quality physics education by funding enough physics teachers, STEM technicians and school science equipment budgets

Good teaching is crucial for both pupils' experience and enjoyment, and for the quality of learning and results they get. It is cited as the second-most important factor for their degree choice among university science students. Yet we've seen a 10% decline in numbers of teachers and an even greater drop in technicians over the past decade. A lack of support and equipment to teach properly is a main cause of disillusionment and poor morale cited by physics teachers. More apparatus is needed to demonstrate physics concepts than other sciences, so any cuts to equipment budgets would hit physics disproportionately. Post-COVID financial pressures should not undermine investment in science education, which is a bedrock of social and economic progress.

2. Use additional non-contact time to enable teachers to engage in subject-specific professional learning, and to give pupils more opportunities for extra-curricular STEM activities

When the promised 1.5 extra hours of non-contact time is delivered, councils will have a crucial role in determining how this is used for maximum effect.

IOP research has shown that teacher training which is focused on subjects and organised among their subject colleagues and peers boosts teacher knowledge, creativity and morale, and in turn translates into better education for pupils. Yet there are far too few opportunities for this. Councils should facilitate and support these options, including through appointing lead teachers and supporting them to fulfil their roles.

The legacy of historic industrial action and contractual constraints on extra-curricular activities means Scotland lags far behind other parts of the UK and Ireland in science club participation. This short-changes pupils, who benefit measurably from the experience of exploring engaging ideas, solving problems and taking part in enriching challenges, co-operating and competing within and between schools. Science clubs show how learning can be put to practical real-world use, and motivates students to pursue STEM activities and careers. Support and signposting is available from organisations like the IOP, STEM ambassadors and employers through advice, mentoring and placements. Additional non-contact time will be crucial in enhancing this until contractual arrangements are modified.

3. Bolster the participation of pupils from underrepresented groups by tackling misperceptions, raising confidence and making equality everyone's business

Just 27% of Physics Higher students are female, compared with 47% in Maths, 53% in Chemistry and 65% in Biology. This imbalance accentuates in academia and industry, and becomes acute at senior levels and in technical roles – just 8% of modern apprentices in engineering and energy are female. Decades of research by the IOP shows that this imbalance stems from perceptions of physics as especially difficult, combined with a general lack of confidence among girls in their intellectual abilities throughout their schooling. We need to tackle both, which will also address similar inequities among deprived, disabled, LGBT+ and some ethnic minority students. Councils should:

Find out more about the IOP's **Limit Less campaign** to get more young people from underrepresented groups into physics, at **iop.org/LimitLess**

- encourage schools to adopt and implement proactive whole-school approaches to address barriers and enhance pupils' confidence.
- appoint an equalities champion to support and press for action in each school and share and celebrate success in improving diversity.

4. Support science-based apprenticeships to close skills gaps and secure youth employment

IOP research has shown that physics-based businesses badly need more skilled workers. 60% of these businesses which want to innovate have had to delay or cancel their plans because of skills shortages. Pressure on this pipeline will become more acute as demand increases, both from commercial opportunities arising from technological developments and public commitments like moving towards net zero. Councils have an important role in delivering the Young Person's Guarantee, to provide every 16-24 year old in Scotland the opportunity of a job, apprenticeship, further or higher education, training programme or volunteering. This programme could help address these gaps, but only if all involved work to realise this potential. All councils should participate in the Raising Aspirations in Science Education (RAiSE) programme, and work to maximise STEM-related work placements and school-employer partnerships as part of the Developing the Young Workforce programme.

5. Work to tailor local business support to science-based businesses

Business Gateway services provide a crucial role in boosting the local economy, and the majority of their clients are micro businesses, as are 93% of physics-based enterprises. Yet local business support for science is outnumbered by leisure, hospitality and retail sectors, which also benefitted the most from additional financial support during the pandemic. Demand for physics skills is likely to grow as we need to find more technological solutions to pressing economic and social challenges. Physics-based roles are well-paid – typically earning around between one-third and a half more than the national average salary. Councils can do more to encourage growth in the local science economy by working with local chambers of commerce and educational institutions to highlight business start-up opportunities to those with scientific knowledge and skills, and review the practical and financial support provided by Business Gateway services to science-based small, medium, and micro-businesses.

About us

The Institute of Physics (IOP) is the professional body and learned society for physics in the UK and Ireland. Our mission is to inspire people to develop their knowledge, understanding and enjoyment of physics, support the development of a diverse and inclusive physics community, and raise public awareness and understanding of physics. We seek to ensure that physics delivers on its exceptional potential to benefit society. Find out more at www.iop.org.