

Levelling Up Physics

Programme Overview & Rationale

University Onboarding Pack | Document 1 of 3 | v1.1 5/5/26

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1. What Is Levelling Up Physics?

Levelling Up Physics is a long-term, university-based outreach programme that provides free near-peer physics tutoring and mentoring for 16–17 year olds from backgrounds currently underrepresented in physics higher education. It can be delivered online or in person, making it sensitive to the context of different university outreach priorities and accessible to participants across the country.

The programme pairs small groups of pre-university students (8–12 per group) with current undergraduate and postgraduate physics students, who act as both tutors and near-peer mentors. Weekly sessions consist of a physics curriculum tutorial related to a key topic from A level physics and a mentoring discussion about an aspect of university life or application. Learning materials for Levelling Up Physics are provided and have been developed collaboratively between participating universities. The programme is adaptable in length with most universities choosing to run either a long (9 month) or short (10 week) course with a subset of the materials.

"Just enjoying physics" — the comment from one participant that captures what Levelling Up Physics is all about: providing a welcoming space where curiosity about physics is celebrated, questions are welcomed, and being interested in physics is normalised for a diverse range of young people.

Programme at a Glance

>20 Universities running Levelling Up And growing!	10:2 Students to tutor ratio Small group near-peer mentoring model	5+ Years running Since 2020	>1000 Young people participated so far 2020–2025
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2. Why Does This Matter? The Case for Action

Physics remains one of the least diverse STEM subjects in UK higher education. The figures below illustrate the scale of the challenge and explain why sustained, targeted outreach like Levelling Up Physics is needed.

The Diversity Gap

UK Physics Undergraduates (2022/23)

- 27.8% female
- 10.4% from an Asian background
- 1.8% Black

UK Physics Academic Staff (2022/23)

- 94% White
- 0.2% Black

Participation in physics post-16 could be categorised as largely white, middle class and male with the problem not being confined to undergraduate study, but present throughout the academic physics career pipeline.

Why One-Off Outreach Is Not Enough

Research consistently shows that single outreach events have limited long-term impact on young people's aspirations. Archer et al (2021) caution that 'one-off' STEM interventions have only limited impact on aspirations, and that programmes running over a period of months are more effective. Levelling Up Physics is specifically designed to address this by providing sustained, weekly engagement over a period of two to nine months in the period during which students are making and submitting their university applications (usually summer term of y12 – spring of y13).

The Role of Role Models and Community

Research by Avraamidou (2020) and Rodd et al (2013) highlights the crucial importance of relationships with individuals who can recognise young people from minoritised groups as competent physics learners — and of safe spaces where they can develop a sense of belonging in physics. In many schools, physics classes are small and overwhelmingly male; some students describe feeling that physics 'isn't for people like them'.

One female participant, attending an all-girls school with just three students in her physics class, said: "We just think, you know, they're not gonna want us anyway, so what's the point?" Levelling Up Physics gave her the confidence to realise that "you do not really need to be a male or a female to be able to do STEM — I have realised that I have as much potential as someone else does."

3. The Evidence Base for Near-Peer Mentoring

Levelling Up Physics is built on a well-established body of evidence for the effectiveness of near-peer mentoring in STEM outreach. Near-peer mentors in this context are undergraduate or postgraduate physics students who meet regularly with groups of pre-university students for both physics tuition and discussion about university study.

What the Research Shows

- Near-peer mentoring has a dual benefit, developing both mentor and mentee (Tenenbaum et al, 2014).
- It can positively impact scientific knowledge and career interest in participants (Verma & Ali, 2023).
- It supports the sustainability of outreach activities by making efficient use of academic staff time (Pluth et al, 2015).
- It promotes a sense of belonging in physics and normalises the experience of struggling with physics problems (Zaniewski & Reinholz, 2016).
- Female facilitators of physics outreach programmes specifically benefit from improved confidence, interest and motivation (Randolph et al, 2022).
- The 'nearness' of the mentor — being close in age and educational stage — is identified as particularly important for changing attitudes in mentees (Wilson & Grigorian, 2019).

4. Evidence of Impact from Levelling Up Physics

The programme has been evaluated since its inception in 2020. Initially, a thorough evaluation of the first year was undertaken by the Evaluation and Innovation in Science Education group at Durham University (Cramman, et al, 2022). Recent evaluation of data over 4 academic years of running the programme at the University of Birmingham provides strong evidence of impact. Full findings are published in:

Published Research

Cottle, D., Willett, E. and Wright, T. (2025) 'Just enjoying physics' — lessons learned from online near-peer outreach to support widening participation in physics. *European Journal of Physics*, 46, 055702. <https://doi.org/10.1088/1361-6404/adeb14>

Key Findings from the 2025 Evaluation

Survey data showed statistically significant improvements in two key attitudinal indicators of participants due to their participation in Levelling Up Physics:

+1.39

Understanding of what it means to study at university

Shift from disagreeing to agreeing (p<0.001)

+1.01

Knowing how to improve physics skills

Shift from neutral to strongly agreeing (p=0.012)

After shorter term engagement with Levelling Up Physics over 10 weeks (the length of the short course), participants showed strong agreement with a range of positive outcomes:

92% Motivation to study physics increased	83% Confidence in physics improved	83% Want a career where physics is beneficial	75% Gained new insights into physics
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Impact on University Recruitment in Physics

At the University of Birmingham of 84 participants who completed the programme between 2021 and 2023 and have since begun undergraduate study, 12 (14.3%) started degree courses at the host university. Of the four who chose physics degrees, three were female and all four were from ethnic groups currently minoritised in physics.

Benefits for Tutors

The programme also has benefits for the undergraduate and postgraduate students who serve as tutors and mentors, including improved confidence, enhanced teaching and communication skills, and better developed employability skills. One tutor was inspired to go on to train as a much needed secondary school physics teacher, writing:

"Being part of this scheme cemented my decision to pursue a pupil-facing role in education." — Levelling Up Physics tutor

5. The Collaborative Model

One of the distinctive strengths of Levelling Up Physics is that it is a collaboration between universities, not a single-institution programme. Partner universities share experiences through regular steering group meetings and support each other in running the programme. This ethos was established from the start of the project in a meeting of representatives from several universities convened by the Institute of Physics in 2019. Levelling Up Physics is supported and endorsed by the Institute of Physics and the Ogden Trust. Current partner institutions include universities across England, Scotland and Wales.

Joining the collaboration gives your department access to jointly produced materials, a community of practice, and the collective wisdom of institutions that have been running the programme for several years without requiring you to start from scratch.

6. Is Levelling Up Physics Right for Your Department?

Levelling Up Physics is a good fit if your department wants to:

- Take sustained, evidence-based action on diversity and widening participation in physics.
- Provide employment and professional development opportunities for your own undergraduate and postgraduate students.
- Build stronger relationships with local schools and colleges.
- Contribute meaningfully to your university's Access and Participation Plan.
- Strengthen applications for equality and diversity awards such as Athena Swan.
- Join a collaborative network of like-minded physics departments across the UK.

Questions to Consider Before Joining

- Is there a member of staff who can take ownership of the programme and liaise with the steering group?
- Does your widening participation strategy include targets related to gender, ethnicity or socioeconomic background in physics?
- Can the programme be embedded within your existing outreach calendar to provide participants with additional touchpoints?

7. Next Steps

This document is the first of three in the Levelling Up Physics University Onboarding Pack. The remaining documents are:

Document 2	Implementation Guide Step-by-step guidance on setting up and running the programme, including timeline, tutor recruitment, safeguarding, and online delivery.
Document 3	Evaluation Toolkit Ready-to-use survey instruments, focus group prompts, demographic data guidance and reporting advice.

To find out more or to express interest in joining the Levelling Up Physics collaboration, please contact:

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