The other side of the classroom

Most physics graduates have an idea of what it's like to be a physics teacher, having been taught by one in the recent past. Indeed, some may even be in physics today thanks to a particularly inspiring teacher. But not enough graduates consider teaching as a potential career option. Find out how you can become a physics teacher in the UK and hear from classroom teachers Cara Hutton and Dave Gash on how and why they made the choice to become educators and what the job involves.

Physics can be a complex and demanding subject. Whether it's the latest research updates from the world of nanotechnology or the newest results from the Large Hadron Collider, understanding such advances and the basics that they are built on is no mean feat. Explaining these concepts to students is even harder, and specialist physics teachers are needed more than ever to ensure that enough students are encouraged to go into physics to take up the many exciting opportunities on offer. And although many countries face a shortage of specialist physics teachers, there are now lots of recruitment initiatives and programmes to help physicists to become teachers and to give non-specialist physics teachers the skills to teach physics with confidence.

A good teacher can invoke a passion for a subject from an early age, arming students with the knowledge and confidence to pursue it in the future. When it comes to the sciences, and especially physics, there is often a misconception that the field is impenetrable or beyond the grasp of the average student. But who better than an actual physicist to convince them otherwise, and help shape the next generation of physicists.

Case study: Cara Hutton

Cara Hutton studied for a BSc in physics at the University of Edinburgh, UK. She went straight on to a PGCE at the University of Cumbria and has been a qualified teacher for four years. She has recently been appointed as an Institute of Physics school-based physics coach and will be working with other local schools to support their teachers and, in turn, their pupils. She currently teaches at Skipton Girls' High School in North Yorkshire.

As I was coming to the end of my third year of my degree, I started to think about what I wanted to do. A lot of companies were advertising for physics graduates to go into software development and programming, but I didn't want a job where I was sitting in front of a computer screen all day. So I did my university's Science Education Placement in a local school to find out if teaching was the way forward for me and I loved it! It was never dull, I learned lots of new things myself, and when a pupil understands a concept they have never met before or have previously struggled with, it's really rewarding. And I was certainly not sitting down all day.

I chose a PGCE because, having just finished my degree, it still gave me a base at university and the opportunity to do some Master's level writing alongside the time in school. However, now I can really see the benefits of school-based training too because there's nothing like being fully immersed in a school to get a complete idea of what the NQT year and beyond will be like.

In my first year I took the opportunity to try out different techniques, some of which worked better than others, but I learnt a lot from that year. I enjoyed building relationships with the pupils and winning round some of the more challenging characters, and also getting to know other members of my school's science team.

Just the other day I came across my notes from my first placement and saw that after I did my very first starter activity in a lesson, a year 7 (ages 11–12) boy came up to me and said "That was really good Miss! I'm looking forward to next time!'"

I love that every day is different. I can teach the same lesson to two separate classes and know it will be different because of the questions the two classes will ask. The best thing is always the pupils. I know at the end of the year that I will have helped them understand more than they did at the start and given them a better choice in life because of it.

Case study: David Gash

David Gash studied for a BSc in physics at the University of Liverpool, UK. He then went on to gain a PGCE at Liverpool and has been a qualified teacher for 10 years. He is the head of science at Gateacre School in Liverpool and has recently completed a Master's in education (leadership and management)

I was 20 when I was accepted by the University of Liverpool to study physics. I honestly didn't take the course seriously at first, despite deeply enjoying its content, and I had no clue what direction it would eventually take me in. That's when a couple of other students on the course said they were going to go into teaching. My life changed forever.

The PGCE course connected me with like-minded people. It unlocked a thirst for learning that was lacking in my previous incarnations. I was actually quite an insecure and shy individual and I remember shaking when I went for the interview for the course. My first day at my first placement school was even more terrifying. Fortunately, I was "team teaching" a group of year 7 students along with another trainee teacher, so we supported each other through it. As a physics specialist, I was very much in demand and I was able to quickly secure a job. Within 18 months, I had been given the role of A-level physics co-ordinator for my school, and I was formally promoted to co-ordinator-level the following year.

Fast-forward eight years and I am now the head of science at the same school and I absolutely love it. In the intervening years, I met my wife, who is a drama teacher at my school, we had our son (who is now nearly two years old) and I also pursued a Master's in education (leadership and management).

A major concern in physics education today is the large gap in the sector for well-qualified, skilled, physics graduates who have a passion for teaching. While there are plenty of driven physics teachers nationwide, we are easily outnumbered by our colleagues in biology and chemistry and they often end up teaching GCSE and A-level physics due to the current shortage.

If you are wondering what constitutes a typical day as a teacher, there is no such thing! Other than following my teaching timetable and planning my lessons for the week, it is very difficult to offer such an overview, given how unique each day truly is. This is one of the best parts of the job – not knowing where the day will take you. What I can say is that I know full well that I enjoy each and every moment.

I personally had very old-school ideas about what a physics teacher does when I first entered the profession. The reality has been so different. Working through experiments and exciting demonstrations – my laboratory ceiling now needs a few coats of paint – going on school trips to CERN and Jodrell Bank, and running competitions with other schools are all a part of a rich and varied job that allows me to be both creative and academic.

Working with children is incredibly rewarding and surprising. I am paid to teach young people about science and help them to understand the universe around them. Yes, it is hard work and there are a lot of things that I would change about education in the UK if I had the power. However, those things pale into insignificance when my students arrive and sit awaiting their next exciting experience in my classroom.

Routes to take

If you are considering becoming a qualified physics teacher in the UK, there are several possible routes. A small number of universities in England, Scotland and Wales offer undergraduate degrees in physics or science leading to Qualified Teacher Status (QTS), but the majority of teachers obtain this status by training in postgraduate programmes. Postgraduates can either specialize in physics with science or physics with maths and there are two main routes: university-led training and school-led training.

University-led training is usually taken as a one-year full-time programme (though part-time options that take longer are also available), leading to a qualification such as a Postgraduate Certificate in Education (PGCE) or a Postgraduate Diploma in Education (PGDE). These courses involve a mixture of training at a higher-education institution and at least 24 weeks spent teaching in schools, usually carried out as two placements in different schools.

As for school-led training (generally only available in England) it can lead to a PGCE or equivalent in a number of ways. The School Direct programme places candidates (who may be paid or unpaid) in a school that will deliver training tailored to the trainee's and the school's needs. An alternative, known as School Centred Initial Teacher Training (SCITT), takes place within a group of neighbouring schools, with a lead school taking overall responsibility for a trainee's development.

You can apply for a place on an undergraduate or postgraduate course via the Universities and Colleges Admissions Service (UCAS), which manages applications to UK full-time higher-education courses. There is a further route for postgraduates in England called Researchers in Schools, which is a three-year bespoke, salaried teacher-training course for candidates who have completed (or are finishing) their PhD.

Whatever your route into teaching, once you've finished your training, you'll be classified as a newly qualified teacher (NQT) and will spend your first year in the classroom with a reduced timetable. In England and Wales, QTS is only required for teachers in local-authority state schools. However, schools outside the control of local authorities – such as independent schools – also prefer to recruit qualified teachers. Also, career options for teachers are significantly better if they have QTS.

[Taken from IOP website > Careers > Working Life > Working in physics March 2017]