IOP Education: Teaching and Student Resources
Institute of Physics

The Institute of Physics is a leading scientific membership society working to advance physics for the benefit of all.

We have a worldwide membership of more than 50,000, from enthusiastic amateurs to those at the top of their fields in academia, business, education and government.

Our purpose is to gather, inspire, guide, represent and celebrate all who share a passion for physics. And, in our role as a charity, we’re here to ensure that physics delivers on its exceptional potential to benefit society.

Alongside professional support for our members, we engage with policymakers and the public to increase awareness and understanding of the value that physics holds for all of us.

Our subsidiary company, IOP Publishing, is a world leader in scientific communications, publishing journals, ebooks, magazines and websites globally.

You can help us transform the future of our discipline. Invest in physics today at iop.org/fundraising.

Find out more about our strategy for success at iop.org/strategy.

Join us

Our affiliation scheme is the simplest way of building a link between your school or college and the Institute (see page 4 for details).

Becoming an individual member takes your relationship to another level. You can then become more involved with the governance of the Institute and access other benefits, including careers advice and chartered status. To find out more about eligibility and the application process for individual membership, visit iop.org/membership.

Contact us

For more information about the resources listed in this brochure, visit iop.org/teachers, email education@iop.org or call us on 020 7470 4800.
Message from the Head of Education

We are committed to providing students with an excellent experience of physics up to the point when they make a choice. And we know that the best way of doing this is in partnership with you, their teachers.

Therefore, we aim to work with and support you in as many ways as we can – through providing resources, distributing small grants, affiliating schools, building communities and leading CPD.

Our resources are listed in this brochure. They are available to you at no cost. However, we hope that they – along with our journals and magazines – will encourage you to affiliate your school or college. The affiliation scheme allows us to build important links with you and your school. It will keep you up to date and ensure that you get an early warning of any event in your area. Furthermore, it is the first step in becoming a part of one of our physics teaching communities through involvement with the Physics Teacher Network, our email discussion lists and TalkPhysics (our community website).

Teaching physics is doing physics: the work is cutting edge, and it exemplifies and brings to bear the processes and thinking of physics. That is why we are keen to facilitate and empower your development as a professional within both the teaching and the physics communities. As your career develops, we hope that you will be providers as well as consumers in the communities above, and will work towards professional accreditation with the Institute.

Physics can provide students with a unique set of experiences, outlooks and ways of thinking. Their development takes place in the laboratories and classrooms of your schools. Our role is to work with you to resource, reward and develop that work, and to make your students’ journeys as authentic, engaging and successful as possible.

Charles Tracy
Head of Education
Schools and Colleges Affiliation Scheme

The Institute offers an affiliation scheme for schools and colleges in the UK and Ireland, which currently costs £50 (€63) a year. International schools that teach the UK curriculum can also join the scheme for £76 (€93) a year.

The scheme entitles you to receive the following publications:

- Physics Education – six times a year
- Classroom Physics – four times a year
- Physics World – monthly

In addition, affiliated institutions benefit from:

- Teaching resources, careers material and posters produced by the Institute and other organisations
- Discounts on Institute conferences and teacher events
- Information and access to local Institute branch activities

Furthermore, as an affiliated school you can nominate a teacher to join IOP’s Education Forum. This forum enables us to seek the views of physics teachers and to involve teachers in areas of policy work such as curriculum consultations. Discussions take place online with periodic face-to-face meetings. Active members can also form and join advisory committees for events and conferences.

To become an affiliated school, visit iop.org/affiliation, or for any enquiries about this scheme, please email affiliation@iop.org.
Physics Education

Physics Education is an international journal that reflects the needs and interests of school/college teachers. It contains articles on the teaching of physics, classroom ideas, education news, and reviews of textbooks, equipment, apps and software. It is a great way to keep up with the latest ideas in teaching physics. Affiliated schools/colleges receive the journal six times a year and have free access to the online archive via iopscience.org.

Classroom Physics

This exclusive newsletter for affiliated schools and colleges keeps you informed of meetings, resources and other support that the Institute and other organisations offer to all teachers of physics. It also includes teaching tips for the 11–16 physics curriculum. The newsletter is distributed four times a year to affiliated schools and colleges, along with the newest posters and resources for your classroom. You can view the latest issue at iop.org/classroomphysics.

Physics World

The Institute’s internationally acclaimed monthly magazine will help you keep in touch with developments in physics, as well as providing inspiration for your students. Affiliated schools receive a paper copy of Physics World on a monthly basis, as well as access to physicsworld.com.
Resources for the classroom

Finding new and engaging resources to use in the classroom can be a challenge, so we’ve created a suite of free resources to help. The following websites, presentations and DVDs will help you to discover exciting ways to teach a variety of topics. Email education@iop.org to order.

Supporting Physics Teaching (SPT)
SPT is an extensive set of materials to help teachers gain a better understanding of physics and develop greater confidence in their teaching. It is designed to support all teachers of physics who want to develop their subject knowledge and will be particularly useful in the first few years of practice. This resource covers all significant topics taught to 5- to 16-year-olds and can be accessed at supportingphysicsteaching.net.

Teaching Advanced Physics (TAP)
This website covers content for A-level specifications in England and Wales, and Advanced Higher in Scotland. It provides teaching tips for the main concepts, as well as lesson plans, experimental details and questions for students. It will be particularly useful for newly qualified teachers in their early years of teaching and for non-specialist teachers. Everything is fully downloadable and customisable in Word. Simply visit tap.iop.org.

Practical Physics
Developed by the Nuffield Foundation and IOP, this collection of experiments demonstrates a wide range of physical concepts and processes. Some of the experiments can be used as starting points for investigations or for enhancement activities. Many have links to carefully selected further reading, and all include information and guidance on apparatus, procedures and teaching notes. To access the experiments, visit practicalphysics.org.
Teaching Astronomy and Space

This resource supports the teaching of astronomy and space, and is built around a series of videos. There are clips to use with students, where astronomers talk about their work in an inspiring and engaging way, as well as guidance on setting up and managing practical activities with students. Detailed supporting teaching notes are included. The resources are free to download from iop.org/space and are also available on DVD.

Teaching Medical Physics

The medical-physics resources that have been available for a number of years have been fully revised and updated. These include PowerPoint slides, video clips, teaching notes and student worksheets for a variety of diagnostic and imaging techniques. The resources are free to download from iop.org/medical and are also available on DVD.

Teaching Radioactivity

This resource supports the teaching of radioactivity, enabling teachers to give students a more authentic and engaging experience of ionising radiations and sub-atomic particles. It includes a video in which the presenter leads a group of teachers through a series of activities that illustrate the properties of ionising radiations, as well as animations and a background radiation worksheet to use in the classroom. The resources are free to download from iop.org/radioactivity and are also available on DVD.
Enrichment resources

To further engage your students, we recommend you explore these resources, grants and events. Activities can be implemented on- or off-timetable. Email education@iop.org to order.

**Ashfield Music Festival**
This resource pack contains everything needed to run a one-day, off-timetable simulation activity. Students work in teams to plan a music festival – they take on specialist roles within the teams and seek advice from a group of experts. The aim is to show students that a knowledge and understanding of physics is useful in the world of business and enterprise. It provides a good opportunity for you to involve parents and STEM ambassadors, and to include physics in your school’s enterprise agenda. Visit iop.org/ashfield.

**Exoplanet Physics**
Exoplanets are planets that orbit stars other than our Sun. This resource was developed to help bring this new and exciting area of research into the classroom. It consists of five practical activities matched to the 11–14 curriculum, which can either be used in lessons or as part of a science club. For full details, visit iop.org/exoplanets.

**Thinking on your feet: Football and physics**
This resource explores eight physics activities linked to the beautiful game. Each session is split into two halves of 45 minutes – just like a football match. The first 45 minutes is spent in the classroom, looking at a football idea and then doing a practical activity that gives insight into what happens on the pitch. The second half of the session applies these ideas to actual football activities. Visit iop.org/football.

Ages 14–16

Ages 11–14

Ages 11–14
Engaging Physicists
An online database of university and national-laboratory outreach officers who can help you run workshops and activities, or help you find a physics speaker for your own event. Visit iop.org/engagingphysicists.

Physics activity pack for STEM clubs
Activity packs containing physics-based ideas, resources and activities for STEM clubs. Available to download from iop.org/stemclubs.

IOP/IET/STFC School Grants Scheme
Receive up to £600 for projects and events linked to the teaching or promotion of physics or engineering. Find out more at iop.org/schoolgrants.

See the world differently
Three interactive posters that illustrate and emphasise at least one aspect of seeing the world differently. The posters change in the dark, under UV light or when they are heated up.

Marvin and Milo reward postcards
Reward student achievement in physics lessons with these playful commendation certificates. Available to download from iop.org/rewardcards.

Marvin and Milo reward stickers
A sheet of 20 stickers featuring the popular cat-and-dog duo. They can be used to reward students.
Careers and student resources

Increasing the visibility of real-world applications of physics and careers is important in encouraging under-represented groups, particularly girls, to take the subject beyond the age of 16. Here are some resources to help you support your students. Email education@iop.org to order.

STEM careers clips
These award-winning short videos make ideal finishers for lessons. Not only does each five- to eight-minute clip summarise a curriculum topic (forces and motion, ultrasound, solar energy and energy efficiency in the home), they also highlight a different career path available to those studying physics beyond 16.

Career posters: Launch your life with physics
This poster series illustrates how useful physics is for careers in and beyond science. The first poster set features a particle physicist and a journalist. The second set features a lawyer and an engineer.

Expand: Physics at A-level/Higher
A leaflet for students making decisions at age 16. It contains advice on subject choices and profiles of people who have studied physics at A-level/Higher, and now work in a variety of jobs, both in and outside science.
Physics at University: your essential guide
A booklet for students considering their options at age 18, with answers to commonly asked questions about career prospects, degree-entry requirements, course content and advice on choosing a university.

My Physics Course
This website is a guide for students considering physics at university in the UK and Ireland. It lists all accredited physics degree courses and typical grade offers. Students can search or compare courses by nation, university or subject combinations, or by distance from a given postcode. Visit myphysicscourse.org.

Pocket physics
An A6 booklet listing physics equations and definitions along with diagrams and useful data. A revision and homework aid for students studying A-level/Higher physics or equivalent.
Gender balance in physics

Only 20% of students progressing to A-level physics are girls, despite physics being taken by nearly equal numbers of girls and boys at GCSE. The reasons for this are long-standing and complex. However, the Institute supports teachers trying to improve progression in their school with information and resources. Email education@iop.org to order.

Resources for science teachers

This set of resources contains guidance on inclusive science teaching. It includes Engaging with Girls: An action pack for teachers, which is an in-depth guide to carrying out action research to understand the issues surrounding girls in physics in your own school, and a set of additional resources on good practice. Also included in the set are a good-practice checklist, a lesson observation template and a staffroom poster with tips on inclusive teaching techniques. Resources are available at iop.org/genderresources.

Whole school resources

Our research suggests that school culture has a significant impact on subject choice, and that working to improve gender equity is likely to have a disproportionate effect on highly gendered subjects such as physics. These whole school resources are designed to support good practice in gender equity across all subjects and aspects of school life. They include Opening Doors: A guide to good practice in countering gender stereotyping in schools, and a set of KS3–4 PSHE lessons that introduce the concept of gender stereotyping to students. Access the resources at iop.org/genderresources.

Reports and research

This set of reports looks at the various factors affecting gender balance in physics. The Girls in the Physics Classroom literature review pulls together the existing research, highlighting common threads and effective strategies. It’s Different for Girls uses data from the National Pupil Database to explore differences in girls progressing to A-level physics in different types of schools, and Closing Doors looks at gender balance in six gendered subjects, including physics. The reports are available to download at iop.org/genderresources.
Get involved

There are plenty of ways that you and your school can get involved with IOP. Our range of workshops, meetings and online forums will keep you up to date and in touch with the physics teaching community.

**Physics Teacher Network**
Physics Network Coordinators (PNCs) organise CPD workshops and events, and provide help and advice for all teachers of physics. Workshops can be tailored to meet individual needs. PNCs also support the Institute’s range of one-day meetings and conferences across the UK and Ireland. To find your local PNC and for a list of CPD workshops, visit [iop.org/network](http://iop.org/network).

**Email discussion lists**
These are designed to provide teachers with a forum to share ideas, ask for advice and exchange views. Emails are sent to all list members and are automatically archived. Lists include:
- PTNC: Physics Teaching News and Comment
- SPUTNIK: Scottish Physics Teaching News and Comment
- NIPTG: Northern Ireland Physics Teachers Group

**TalkPhysics**
TalkPhysics is a digital forum for all teachers of physics, including non-specialists, technicians, trainees and teacher trainers. It’s a space to discuss ideas, share advice and discover resources – including the Classroom Physics archive, Marvin and Milo and our growing series of webinars. Join more than 9,600 members of the physics education community at [talkphysics.org](http://talkphysics.org).

**Anthony Waterhouse Fellowship**
Worth £2,000 over 12–18 months, the fellowship provides an opportunity for current teachers of physics to access funds to help them develop a dormant or nascent idea that will be useful in the classroom. It is generously endowed by Helen Parsons, in memory of her brother and his passion for physics. For full details, visit [iop.org/waterhousefellowship](http://iop.org/waterhousefellowship).

**Stimulating Physics Network**
Teaching and Learning Coaches (TLCs) provide free CPD for all teachers of physics. Teachers at our partner schools benefit from a bespoke programme of CPD, including tools to address gender imbalance at physics A-level.

Join us at [stimulatingphysics.org/join](http://stimulatingphysics.org/join). Or find a workshop near you at [stimulatingphysics.org/regions](http://stimulatingphysics.org/regions).

**@TakeOnPhysics**
Our Twitter feed is designed for, and by, teachers of physics. We use it to share advice, events and resources – from the best physics apps to the first Vine from space.

Follow us [@TakeOnPhysics](http://TakeOnPhysics) to connect with the wider physics community.
The future of physics teaching

One of the ways in which we seek to reduce the national shortage of physics teachers is through support for early career teachers. We provide resources, workshops and online communities for all novice science teachers.

School Experience Programme (SEP)

This scheme matches prospective physics teachers with schools that are willing to allow them to come and observe their lessons. It enables prospective teachers to decide if teaching is the career for them plus experience to support their teacher-training application. It also allows returning teachers to refresh their curriculum and pedagogical knowledge before returning to the classroom.

If your school can offer SEP, visit iop.org/sepschools. Prospective teachers who wish to take part should visit iop.org/sep.

Learning to Teach Physics

A free programme for all student and early career teachers of physics in the UK and Ireland, including those who have another specialism. Learning to Teach Physics (LTP) provides support and advice via regular email bulletins, IOP blog posts, teaching resources and events, and uses our teacher discussion forum talkphysics.org. To register for LTP, visit iop.org/student-teacher.

We are also able to offer mentoring to a limited number of student and early career physics teachers in England – for more information, visit stimulatingphysics.org/mentoring.

School Direct registration programme

We have established a free registration service specifically for School Direct schools looking to recruit physics teachers. The programme provides marketing advice, event support and advertising space on our website for your recruitment events. To register your school, visit iop.org/schooldirect.
To request resources, or if you have any questions, please email education@iop.org.
The Kitemark is a symbol of certification by BSI and has been awarded to the Institute of Physics for exceptional practice in environmental management systems.

Certificate number: EMS 573735