IOP Education: Teaching and Student Resources
The Institute of Physics

The Institute of Physics is a leading scientific society. We are a charitable organisation with a worldwide membership of more than 50,000, working together to advance physics education, research and application.

We engage with policymakers and the general public to develop awareness and understanding of the value of physics and, through IOP Publishing, we are world leaders in professional scientific communications.

Join us

Our affiliation scheme is the simplest way of building a link between your school or college and the Institute. 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. There are three grades of membership: associate, member and fellow.

To find out more about eligibility and the application process, visit www.iop.org/membership.

Contact us

For more information about the resources listed in this brochure visit www.iop.org/teachers, send an e-mail to education@iop.org or call us on 020 7470 4800.
Message from 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 early warning of any events 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 e-mail 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 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) per annum. 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:
• *Classroom Physics* – four times a year
• *Physics World* – monthly
• *Physics Education* – six times a year

Refer to the adjacent page for more information about these publications.

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. Active members can also form and join advisory committees for events and conferences.

Discussions take place online through [www.talkphysics.org/forum](http://www.talkphysics.org/forum), with periodic face-to-face meetings. Once your institution is affiliated with IOP, e-mail education@iop.org with “Education Forum” in the subject title to nominate a teacher to represent you.

To become an affiliated school, simply complete the form at the back of this brochure and return it in the post. Alternatively, download a form from [www.iop.org/affiliation](http://www.iop.org/affiliation) and return it to affiliation@iop.org.

For any enquiries about this scheme please e-mail 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 [www.iopscience.org](http://www.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 11–16-year-old students. 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 of *Classroom Physics* at [www.iop.org/affiliation](http://www.iop.org/affiliation).

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](http://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 discover exciting ways to teach a variety of topics.

Supporting Physics Teaching (SPT)
The SPT initiative has been developed over the last few years to help teachers gain a better understanding of physics and develop greater confidence in their teaching of it. It is designed to support all teachers of physics who want to develop their subject knowledge, particularly those who are new to teaching. This resource covers the entire 11–16 physics curriculum and can be accessed via 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 pupils. 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 www.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 available on our website and 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 materials are free to download from [www.teachingmedicalphysics.org.uk](http://www.teachingmedicalphysics.org.uk) and are also available on DVD, along with the 2011 schools lecture “From X-rays to anti-matter – the science of seeing inside your body”.

**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 available on our website and on DVD.

**Ages 11–16**

**Ages 14–16**

**Ages 14–19**
Voicebox: The Physics and Evolution of Speech

This booklet and accompanying electronic resources provide a set of practical activities that encourage students to understand human speech at a basic level and to explore animal sounds and the evolution of speech, with a clear link to the “How Science Works” part of the curriculum. The practical activities and interactive software can be used flexibly, as a circus, or as a mix of student practical activities and teacher demonstrations. To access visit www.iop.org/voicebox.

Physics in Concert

This resource is based on the Ashfield Music Festival activity (see p10) and incorporates many of its features, but it can also be run in lessons, rather than off-timetable. Students work in teams and explore how physics applies to the context of planning a music event. The resource is available to download at www.iop.org/concert.

Physics and Ethics Education Project (PEEP)

PEEP is an interactive website and virtual learning environment for secondary-school science teachers and their students. It has been developed to highlight the moral, ethical, social, economic, environmental and technological implications and applications of physics. Access it at www.peep.ac.uk.

Ages 11–14

Ages 11–14

Ages 14–19
Girls 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.

Science: It’s a People Thing

This workshop uses role models to facilitate small-group discussion and explore gender stereotyping in a comfortable and safe environment. The discussions look at myths and facts about girls and women in STEM, how these subjects connect with issues that girls care about, and their importance as a gateway into a wide range of interesting jobs and careers. The workshop pack includes everything needed for you to run a session of 60–90 minutes, or a longer half-day event. Resources are available at www.iop.org/girlsinphysics.

Engaging with Girls – an action pack for teachers

Whether you are working in a mixed or all-girls setting, you will find this an invaluable pack, both for immediate classroom ideas and for contemplating larger changes in your teaching or department. It includes a Guide to Action Research, intended for those attempting action research, as a way of changing their practice, for the first time. Resources are available at www.iop.org/girlsinphysics.

Girls in the Physics Classroom

The Review of Research on Girls’ Participation in Physics, published in 2006, summarises the research available at the time. The publication has been widely referenced in other reports and publications since that date. For practical advice on increasing the participation of girls in post-16 physics, refer to A Teachers’ Guide for Action. The advice is grounded in work carried out in classrooms and the suggested methods have been used successfully by other teachers and their students. It includes questionnaires to use with both students and colleagues. Resources are available at www.iop.org/girlsinphysics.
Enrichment resources

To further engage your students we recommend you explore these events, grants and resources. Activities can be implemented on- or off-timetable by your own school staff or by drawing in external support.

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 www.iop.org/ashfield.

Exoplanets

This new set of curriculum-linked practical activities will help you use far-off planets to engage students with physics in the classroom. Available from spring 2015. Keep an eye on www.iop.org/education for updates.

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 student 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 www.iop.org/football.

Ages 14–16

Ages 11–14

Ages 11–14

www.iop.org/teachers
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 www.iop.org/engagingphysicists.

Physics activity pack for STEM clubs

IOP/IET/STFC School Grants Scheme
Receive up to £500 for projects and events linked to the teaching or promotion of physics or engineering. Find out more at www.iop.org/teachers.

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. For more information visit www.physics.org/world.

Marvin and Milo reward postcards
Reward student achievement in physics lessons with these playful commendation certificates. Available to download from www.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 and encourage them to make use of the resources on the www.physics.org website.
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.

**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 new poster series illustrates how useful physics is for careers in and beyond science. The first poster set features a particle physicist and a journalist. New sets will be available from 2015.

**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. It also points students to [www.physics.org/careers](http://www.physics.org/careers) for further information.

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Ages 14–16  
Ages 11–19  
Ages 14–16
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, subject combinations or by distance from a given postcode. Visit www.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.
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 Co-ordinators (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 www.iop.org/network.

E-mail discussion lists
These are designed to provide teachers with a forum to share ideas, ask for advice and exchange views. E-mails 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 our online learning community for teachers of physics. It’s a safe space to ask questions, share ideas and access teaching resources – including Classroom Physics and the Supporting Physics Teaching materials. Join more than 9000 science teachers for free at www.talkphysics.org.

Anthony Waterhouse Fellowship
Worth £2500 over two years, 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 www.iop.org/teachers.

@TakeOnPhysics
Our Twitter feed is ideal for new teachers of physics. We use it to share ideas, events and resources: from the best physics apps to the first Vine from space, plus a blog series reflecting on the challenges of teaching energy.

Follow @TakeOnPhysics to build your own teacher network and 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.

**Student Teacher Affiliation**
A free scheme for all student teachers of secondary science in the UK and Ireland. Student teacher affiliates will receive advice and support throughout their training year through a combination of channels, including access to talkphysics.org, regular e-mail bulletins, IOP blog posts and resources to help develop teaching expertise in physics. For further details visit www.iop.org/student-teacher.

**Learning to Teach Physics**
Learning to Teach Physics is a broad programme that supports all novice science teachers as they build their confidence in teaching physics. Support covers all student, NQT and early-career science teachers in the UK and Ireland. Students’ involvement with the programme begins with their training period when they receive a booklet highlighting Institute resources and encouraging them to register with the Student Teacher Affiliation Scheme. Visit www.iop.org/education/ltp for more information.

**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 www.iop.org/schooldirect.
To become an IOP Affiliate School, simply fill in this form, tear it off, fold and secure, then put it in the post.

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**Type of school**
- ☐ Mixed
- ☐ Boys
- ☐ Girls
- ☐ 11–16
- ☐ 11–18
- ☐ 14–18
- ☐ Selective
- ☐ Comprehensive
- ☐ FE college/sixth-form
- ☐ Independent (fee paying)
- ☐ Academy

The education department supports a number of e-mail discussion lists designed to provide teachers with a forum to share ideas, ask for advice and exchange views. If you would like to be added to any of these lists please tick the relevant boxes.

- ☐ PTNC  Physics Teaching News and Comment – for all those with an interest in the teaching and learning of physics.
- ☐ SPUTNIK  Scottish Physics Teaching News and Comment – for those teaching physics in Scotland.
- ☐ NIPTG  Northern Ireland Physics Teachers Group – for those teaching physics in Northern Ireland.

*required field

When we receive your application, we will send you an invoice for your first year’s subscription. You can pay by cheque for £50.00 or €63.00 (made payable to the Institute of Physics) or BACS transfer.

Data Protection Act.
The information you have supplied on this form will be held on an Institute of Physics database. The Institute may use your data in connection with sending information about events and activities which may be relevant to you. The Institute will not disclose your information to any third parties.
If you have any questions about the resources in this brochure please e-mail education@iop.org

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www.iop.org/education
www.facebook.com/instituteofphysics
www.twitter.com/takeonphysics

Registered charity number: 293851
Charity registered in Scotland:
SC040092

Updated November 2014

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