IOP | Institute of Physics
Education *Supporting Teachers*

Classroomphysics
The newsletter for affiliated schools
March 2009 Issue 8

Teachers' action research projects engage more girls with physics

At the recent Association for Science Education (ASE) Annual Conference, three passionate science teachers discussed their successful experiences of encouraging more girls to take up physics. The session formed part of a wider programme involving a year-long action research project supported by the Institute of Physics and funded by the Department for Children, Schools and Families, and delivered as continuing professional developement at Science Learning Centres throughout England.

The Girls into Physics Action Research project tackles the persistent problem of under-representation of girls in post-16 physics despite there being a significant number of potential female candidates. Participating teachers were supported by a research and evaluation team to conduct small-scale action research projects.

Angie Daly from the research team stressed the importance of pupil voice and teachers' reflection on their own and collective teacher practice: "Listening to and actively seeking students' opinions on learning and the teaching of physics have been a central part of teachers bringing about change within their own classrooms. This experience has had a significant effect on teachers' reflection on their own learning and teaching methods, with classroom specialists concluding that more gender-aware teaching is better for both boys' and girls' engagement with physics."

Suzanne Tanser, an early-career teacher, presented her work with a girls-only class at Priesthorpe School, Pudsey. Acting as a positive role model for the girls, Suzanne found that effective teaching styles to engage girls included more discussion time; posters and presentations; increased practical, group and project work; and "girl-friendly" examples. She was keen to point out that this didn't always mean talking about hair straighteners but focusing on applications of physics that girls found more interesting and engaging.

Participating students at St Michael's Roman Catholic School engage in action research project work.

The value of contextualising physics learning was echoed by Chris Colclough of St Michael's Roman Catholic School, Billingham, who believes that "you can't isolate the experience". She suggested that other teachers should use every opportunity to promote physics in the real world of jobs, industry and society. Chris also found that the action-research process enabled a critical reflection on her own teaching. An ardent biologist, she was able to transfer her learning and teaching experience to become an "effective facilitator of learning" in the physics classroom.

Caitriona McKnight of The Meridian School, Royston has been involved with the Girls into Physics Action Research programme since 2007 and more recently she has worked with pupil researchers to help find out "how relevance affects the interest of girls in physics". Her experience has also shown that working with student researchers (a group of three girls and one boy) has been a valuable way to get all of the participating students engaged in the changes taking place in the classroom. As well as gathering and reflecting on data for the project, the young researchers felt that their involvement was an effective way of enabling "students' views to be listened to".

All three teachers presenting at the ASE conference found that the Girls into Physics Action Research project's materials and workshops were a source of support and encouragement. Engaging directly with students, especially girls, on their attitudes to physics also helped teachers to better understand their students' needs and to respond in innovative and effective ways to develop subject learning and teaching.

For more information: about the one-day course offered by Science Learning Centres, visit www.sciencelearningcentres.org.uk. To find out more about future work, contact Clare Thomson (e-mail clare.thomson@iop.org).

For further details, including project evaluation, contact the Girls into Physics Action Research programme's research and evaluation team:

- Angie Daly, Edge Hill University (e-mail angela.daly@edgehill.ac.uk);
- Karen Bultitude, the University of the West of England, Bristol (e-mail karen.bultitude@uwe.ac.uk); and
- Laura Grant, Laura Grant Associates (e-mail laura@lauragrantassociates.co.uk).

Editorial

Welcome to the spring issue of *Classroom Physics*. If you are an affiliated-school member you will be used to seeing this quarterly newsletter, with its mix of news, forthcoming events and information about resources.

This issue is accompanied by the Institute's new education brochure for 2009 and last year's schools' lecture DVD. If you haven't heard about our affiliation scheme or don't think that it is for you because you are not a specialist, enjoy the newsletter and give joining the Institute some thought.

We feature two important Institute initiatives: the work to support teachers' projects to encourage more girls to continue studying physics post-16 (p1), and our drive to develop careers resources to use in the classroom, emphasising both careers from physics as well as careers in physics (p3).

Our Teacher Network goes from strength to strength and offers subject-specific INSET and support across the UK. You don't have to be in an affiliated school to profit from this support. Visit our web pages to find the name of your local coordinator (p5).

If you want to look at ways to enrich the learning experience that you offer your students, you might like to explore the Researchers in Residence initiative (p5) or the Learning Skills for Science materials (p5). For sixth-formers there are opportunities to apply for Nuffield Science Bursaries, to support a year-12 summer project (p4). There are also a number of lectures, masterclasses and competitions for students (p7), as well as all of the National Science and Engineering Week events (p4).

If you're a teacher who wants to widen your horizons or share your expertise with others, you may be interested in becoming a network coordinator (p2). Also, the Royal Meteorological Society is looking for two teacher fellows (p3).

This issue features resources from the Physics and Ethics in Education website, which should be your first port of call for any aspect of "how science works" (p7).

Many thanks to those of you who completed the recent questionnaire. Your comments are always appreciated and noted, and you should all have received your extra resources by now.

Clare Thomson, editor (tel 020 7470 4981, e-mail clare.thomson@iop.org).

Are you experienced?

It may be the title of a Jimi Hendrix album but it's also one of the qualities that we look for in our Teacher Network coordinators. We have 40 coordinators spread across the UK and the Republic of Ireland who typically deliver 2700 days of training in total per year for the network. They have one thing in common – they want to make a difference. If you feel that you'd like to help to support other teachers of physics, then read on.

Network coordinators work for a few hours each week delivering workshops, organising meetings for teachers and generally helping those struggling to teach physics. The exact nature of the work is dependent on local need, so a good feel for the state of physics teaching locally is useful too. Other attributes that we look for are enthusiasm for the subject and a range of teaching experience. This may sound a tall order for a part-time job, but wanting to make a difference is the key and you'll soon see that we do. You'll also need to be flexible about time. We have three training meetings per year and you will be required to attend an initial two-day induction course.

You may think that this is a big step to make but we do give training and provide plenty of resources. Coordinators receive expenses to help them to carry out their work and £3000 per annum for their time.

At the moment we are looking to recruit people in the following areas: Lancashire, Cumbria, Sheffield, Oxford, Birmingham, Newcastle, London, Bristol, Reading, Leeds and the south east of England. If you don't reside in one of these areas but are still interested, get in touch so that we can keep your details on our records for future use.

To apply, send a CV and a letter to me (e-mail gary.williams@iop.org) outlining what you think your local area needs and how you think you could meet those needs. We hope to interview around Easter time and to run the induction meeting before the summer break. If you want to discuss the role or need more details, don't hesitate to get in touch with me via the same e-mail address.

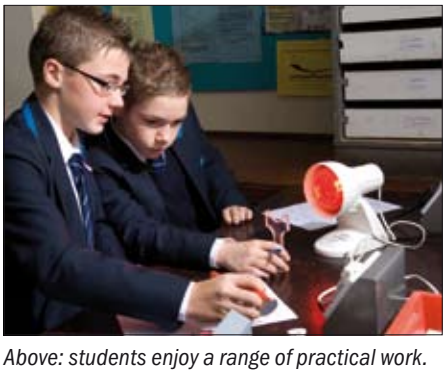
Gary Williams, national Teacher Network coordinator

Resources focus on a practical-work strategy

It is important for students to experience high-quality practical science at school. But what is practical work in science? Why is practical work in science such an essential part of a science education? What are the purposes of practical work? How, when and where should it be carried out to maximise its effectiveness? And how can the quality of practical work in science be improved?

Working closely with other stakeholders, the Science Community Representing Education (SCORE) has developed a strategy for practical work in science based on the report prepared by the Association for Science Education (ASE) and the Royal Society (RS). SCORE is convened by the RS and its other founding partners are the Institute of Physics, the Royal Society of Chemistry, the Institute of Biology, the Biosciences Federation, the Science Council and the ASE.

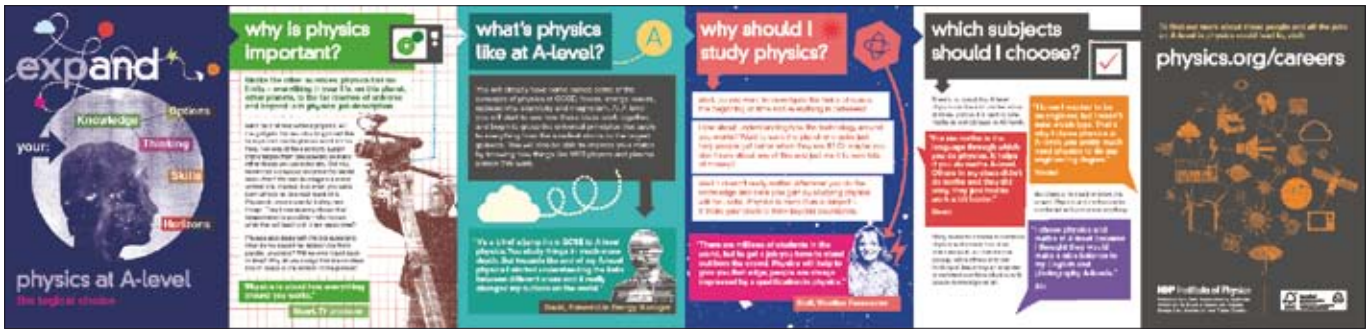
With this newsletter, affiliated schools will have received "Getting practical: a framework for practical science in schools". The booklet aims to help you to recognise and plan for a wide variety of high-quality science practical work, ranging from out-of-the-classroom learning to opportunities for students to practise specific techniques and procedures. The framework is a useful, pithy document that you can give to your head teacher to encourage them to give you time, funding and improved laboratory space.



Above: students enjoy a range of practical work.

If you would like a copy of the companion resource book entitled *Explore, inspire, discover: practical work in science*, get in touch (e-mail education@iop,org). Both publications are available in PDF format from the SCORE website.

For more information: visit www.score-education.org.

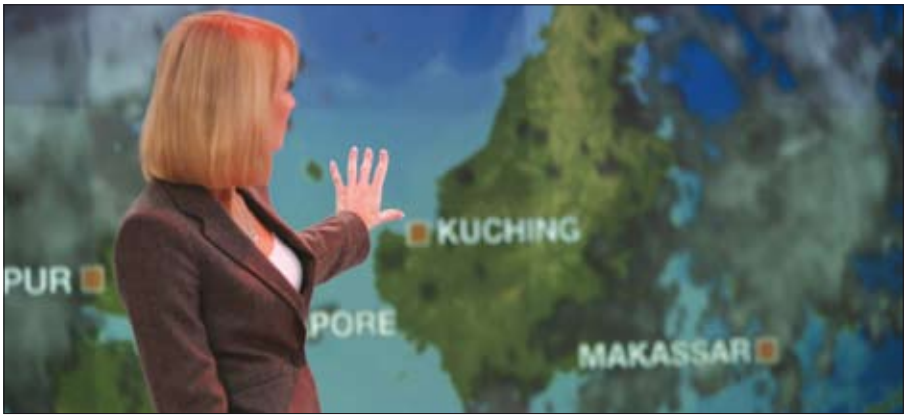


Embedding careers information into science lessons: focus on meteorology

If you have studied physics beyond the age of 16, you will probably appreciate that the benefits can last a lifetime. The number of careers in which physics knowledge or skills are either vital or at least important is almost as vast as the subject itself. However, convincing your students of this can sometimes be a challenge. Generic talk of transferable skills does little to tackle the entrenched idea among many of them that physics is an abstract subject and has little real-world application.

The Institute is working hard to develop resources to help embed careers into lessons. If your school is affiliated you will have received the new "Expand" leaflet, which illustrates careers in sectors as diverse as law and medicine. With this issue, affiliated schools will have received the new leaflet produced by the Royal Meteorological Society (RMetS) about careers in weather and climate. Future issues of *Classroom Physics* will feature other careers.

Meteorology is an area with a shortage of physics graduates and so job prospects are good. It is a relatively easy topic to embed into your science lessons because discussions are easy to initiate. You could use the fact that many of your students may be concerned about climate change, or if that fails, just use the usual British conversational opener about how the weather's been of late. In any case, all of them will have seen at least one aspect of what meteorologists do – they present the weather on television.



Aljazeera English presenter Steff Gaulter enjoys keeping a firm grip on the global weather forecast.

You may choose to discuss meteorology careers as a finisher activity for a climate-change lesson with your year-7/S1 class, or maybe you could use it in your A-level/Higher class as an example of how the kinetic theory of gases is applied. For younger students this could then be followed up by an activity based around physics careers in the renewable-energy sector, or for the older ones perhaps a discussion about how physics is used to predict the behaviour of all types of complex systems in everything from economics to evolution.

Whatever way you choose to do it, at least they'll get the idea that physics applies to everyday life. Another option is to contact RMetS to arrange a school visit from a real-life weather scientist to talk to your students directly about career opportunities. **Taj Bhutta**, careers coordinator (e-mail taj.bhutta@iop.org)

For more information: visit www.rmets.org/activities/schools for details about weather and science careers.

Royal Meteorological Society calls for science teachers to become fellows

The Royal Meteorological Society (RMetS) is looking to appoint two teacher fellows to work with the society during the summer, to develop stimulating teaching resources in weather and climate. Applications are invited from interested primary- or secondary-science, geography, mathematics and citizenship teachers.

The key tasks of the fellows will be to:

- Identify a topic related to weather or climate where they feel additional teaching resources are needed to meet specific specification requirements, or where weather and climate could be used as an example of a more general concept.
- Spend a day with a relevant subject specialist, identified by the RMetS.
- Spend four days writing and developing a set of teaching resources, using a template supplied by the RMetS. The end product would typically be one lesson's worth of resources.

Fellows will be awarded £500, six months RMetS membership and expenses. All materials developed will be made freely available online at www.rmets.org.

Interested teachers who have at least one year's classroom experience should send their application to Sylvia Knight (e-mail education@rmets.org) by 9 April. This should include:

- Details of a relevant topic area, with clear curriculum links, that they would like to focus on, demonstrating a good awareness of what resources already exist in the area, if any.
- A brief up-to-date CV including details of qualifications, experience and current position.

Science bursary scheme takes post-16 students behind the scenes in STEM subjects

The Nuffield Science Bursary (NSB) scheme offers first-year post-16 science students throughout the UK an opportunity to work alongside practising scientists. Unlike work experience schemes, participating students carry out a project of their own that will make a contribution to the work of the host organisation. The STEM-based projects last from four to six weeks and students complete them during their summer holiday. In 2008 more than 90 students took part in physics bursary placements.

Susan Sun from Oxford High School took part in a six-week bursary placement at the Culham Science Centre last summer. Her project was entitled "Plasma transport: fast particles in turbulent fields". During her placement she developed methods for analysing and presenting data from MCUEBIT computer simulations of fast particles in the turbulent electromagnetic fields of a tokamak (a magnetic bottle that confines the very hotly charged particles that make up a fusion plasma, where the nuclear-fusion reaction occurs).

Of her placement Susan said: "I had a chance to talk to research scientists and to get a first-hand taste of what research is like. It has definitely encouraged me to pursue a career in this field."

Bursary holder Susan Sun at work on her project.

Comments from other bursary holders show how influential it has been.

Nisha Nesaratnam, Aylesbury High School, said: "Carrying out an investigation that is relevant to current scientific research was both exciting and informative, and has confirmed for me that a career in research would be ideal for me."

Anjali Gangadharan, Boroughmuir High School, Scotland, said: "I think that the most valuable part of my experience was the chance I was given to work in a laboratory surrounded by scientists who were willing to share their expertise, and being trusted with equipment that is expensive and complex."

The Nuffield Foundation is still looking for students to take part in placements this summer and it is keen for more students to take bursary placements in physics-related projects. If you teach students who you think might be interested in applying for a bursary, contact Sarah Saunders (tel 020 7681 9626) at the Nuffield Foundation who will put you in touch with your local regional coordinator. It is worth noting that demand for bursary placements is high, so the sooner that you can do this the better.

For more information: visit the NSB website at www.nuffieldfoundation.org/scb or e-mail scb@nuffieldfoundation.org.

Major science event hits the UK in March

There will be many opportunities to join in with this 10-day, UK-wide celebration of science and engineering. Events will be taking place across the country and there will be online activities, challenges and competitions galore.

"Darwin in space", a competition tailored for 5–13-year-olds, will invite children to explore what Darwin might have discovered if the Beagle had taken him, not to the Galapagos Islands, but to a new planet where life exists. Prize and entry details are available on the National Science and Engineering Week website. The closing date is 16 March.

Where should science and technology take us in the future? What are the likely implications of our discoveries? Do you worry about science and technology moving too quickly? "Change exchange" will provide an opportunity for you and your students to share any hopes and concerns about science and engineering directly with UK scientists and engineers. Find out what scientists think personally and professionally about the future for science and technology, and add your own comments at www.changeexchange.org.uk.

National Science and Engineering Week is coordinated by the British Science Association in partnership with the Engineering and Technology Board, with funding from the Department for Innovation, Universities and Skills.

For more information: visit www.nsew.org.uk for details about a "What's on" guide, other mass-participation activities and an online programme of events.

The Institute helps schools to become part of the online physics community

MyIOP was launched in September 2008. It's designed to put you at the heart of the physics community in a secure, online environment where you can communicate with your selected network of contacts. *MyIOP* gives you access to a unique pool of physics expertise and the opportunity to make positive connections with like-minded people around the world.

MyIOP puts you in direct contact with the Education Group and your local branch via the networks menu, and it is an ideal forum for voicing your opinions, sharing your ideas and presenting your theories. It is the perfect place to start a debate. You can also share your interests, hobbies, activities and experiences with the people who you choose to share them with, in a safe and unregulated environment. It could widen your horizons and enrich your life.

If you teach at an affiliated school and you want to try using *MyIOP*, your username is your school membership number and your password is the surname of the named contact. If you have any queries (e.g. about logging on to the site), contact Gita Tailor (e-mail gita.tailor@iop.org).

Teacher Network delivers a great day of physics for all

The Institute's Teacher Network organises all sorts of meetings for those teaching physics, from one-to-one help sessions for non-physicists, to twilight sessions for clusters of schools, up to whole-day meetings. If you need more than a whole day of physics (and who doesn't?), take a look at the "Physics update" courses at http://www.iop.org/activity/education/Events/Events%20for%20Teachers/index.html.

Our network-day meetings typically feature a mix of workshops and lectures with plenty of opportunity to chat with colleagues, and while they say that there's no such thing as a free lunch, chances are you'll get one at a network-day meeting. In fact, nearly all of our meetings are free of charge. By "nearly" I mean with only one or two exceptions, which isn't bad going when you consider that we deliver the equivalent of 2700 days of support each year.

But don't be misled. Low cost does not mean low quality. If you managed to attend the recent ASE conference in Reading and benefited from one of the many workshops that the network ran, then you will have realised that the quality of our workshops is very high. The coordinators are all experienced physics teachers – we know what sort of meetings that we'd like to go to and what sort of things we'd like to see, so planning a great day is what we do best.

The events listings (pp6–7) have plenty of dates for your diary. We don't quite have events planned for every corner of the UK, but get in touch with your local coordinator if you want to know more about what may be happening in your area.

A recent Teacher Network meeting in full flow.

Gary Williams, national Teacher Network coordinator

For more information: visit www.iop.org/activity/education/Teacher_Support/Teachers_Network/page_2574.html.

New programme boosts post-16 science teaching

Learning Skills for Science (LSS) has recently been developed by the Gatsby Science Enhancement Programme (SEP) and Nuffield Curriculum Centre to include subject-specific activities to support the new A-level specifications in biology, chemistry, physics, applied science, and science in society. The new Learning Skills for Post-16 Sciences programme was launched in January and is being piloted in schools and colleges throughout the UK during the current academic year 2008/2009. Heads of schools and colleges who are interested in being involved in the pilot scheme are invited to contact the LSS team for details.

The LSS programme aims to integrate high-order skills, such as inquiry, problem-solving, and thinking and learning skills, into the teaching of scientific content. It will provide teaching methods and student activities that foster specific skills development in six key areas: information retrieval, listening and observing, scientific reading, data representation, scientific writing, and knowledge presentation. Each skill area is divided into a number of subskills (e.g. data representation covers how to represent information using visuals, extract tabular data and interpret graphs).

LSS was first introduced to UK schools in 2005 for teachers of KS4 sciences (students aged 14–16) and has since achieved widespread recognition with more than 1000 trained teachers in the UK alone. An independent evaluation confirmed the success of the LSS programme as "invaluable for students both as future citizens and as potential scientists" and highlighted the demand for similar materials for both younger and older students. The new Learning Skills for Post-16 Sciences programme is the first step to fulfilling this demand. In addition to the pilot scheme, activities are available through a two-day training programme supported by an activity book and website of resources.

For more information: visit http://www.sep.org.uk/lss.asp or contact the LSS team (e-mail lss@sep.org.uk).

School outreach programme puts students in direct contact with research

Researchers in Residence (RinR) is a scheme funded by the Research Councils UK and the Wellcome Trust that facilitates the placement of researchers in UK secondary schools. The aim of this scheme is to allow students to connect with researchers as people, to break down negative stereotypes and to raise the motivation and aspirations of students. In March 2008, Andreea Font, a postdoctoral fellow at the University of Durham, was a Researcher in Residence at Durham High School for Girls (DHSG).

Andreea delivered several interactive lectures to groups in year 7 and year 10 on the subject of the formation of our universe. The lectures sparked a lot of interest and the inquiries extended further into the origin of the Big Bang, the formation of stars and galaxies, and even the possibility of life on other planets. Andreea also talked about her own research at the University of Durham, where she uses a large supercomputer to simulate the formation of galaxies like our own. She illustrated the formation of the Milky Way with a movie created directly from the computer calculations. Her message was that astronomy is a very active field of research, where the accumulation of knowledge is still ongoing, and that everyone with a passion for the field can one day make an important contribution.

The enthusiastic response and the keen interest towards science shown by the girls at DHSG were proof that they are on the right path to become "science-educated citizens". No doubt some of them will choose to follow careers in science-related fields. Nevertheless, support for outreach programmes such as RinR is crucial for enabling more students to learn more about current science achievements and to encourage them to pursue their dreams.

Andreea Font brings real-life physics to DHSG.

For more information: If you are interested in finding an RinR in your area, register at http://www.researchersinresidence.ac.uk.

Events

EVENTS FOR TEACHERS

The Mystery of Dark Matter Teacher Workshop

Charterhouse School

18 March, 4.00 p.m.

This is the first instalment in a series of in-class educational resources by Dr Damian Pope, senior outreach manager, Perimeter Institute for Theoretical Physics, Ontario, Canada, designed to help teachers to explain a range of important physics topics. Each module has been designed for expert and novice teachers, and has been thoroughly tested in classrooms.

Details and booking: contact Steve Hearn (e-mail sth@charterhouse.org.uk).

Physics Update

School of Physics and Astronomy, University of Manchester

3–5 April

This three-day residential course has an exciting programme of lectures and workshops. A tour of the research laboratories is also included.

Accommodation: Chancellors Hotel and Conference Centre, Manchester.

Details and booking: contact Leila Solomon (e-mail leila.solomon@iop.org).

Space Conference for Science Teachers

Science Learning Centre East Midlands, Leicester

4–6 April

This three-day residential conference, the first of its kind in the UK, includes a keynote talk given by Dr Simon Singh and a variety of workshops focusing on how to use space science and climate change as contexts to enhance STEM-curriculum teaching.

Subsidies: East Midlands teachers only.

Details and booking: contact Sarah Hill (e-mail sarahh@spacecentre.co.uk).

Salters Horners Advanced Physics Residential Courses

University of York

30 March – 1 April: A2 preparation, teachers course

31 March – 1 April: AS and A2 preparation, technicians course

15–17 July: AS preparation, teachers course

Details and booking: visit www.york.ac.uk/org/seg.salters/physics or contact Sandra Wilmott (e-mail slw5@york.ac.uk).

IOP North Wales Teacher Network

The School of Education, Bangor University

2 June

This is a conference for all who teach physics. It will feature a day of workshops, lectures and networking. Workshops include IYA2009 activities and VPLab software.

Details: contact Andrea Fesmer (e-mail andrea.fesmer@talk21.com).

Stirling Physics Meeting

University of Stirling

3 June

This is a day of lectures and workshops, and there will be an exhibition.

Details: contact Tom Dickson (e-mail tom.dickson@fife.gov.uk).

Rugby Physics Meeting

Rugby School

4 June

This one-day event for teachers in schools and colleges will offer delegates information, stimulation and communication. It will include a series of lectures, an exhibition and workshops.

Details and booking: contact Leila Solomon (e-mail Leila.solomon@iop.org).

Oxford Physics Meeting

Denys Wilkinson Physics Building, Keeble Road, University of Oxford

23 June

This event will feature a programme of lectures, including a talk given by Dame Jocelyn Bell Burnell about where matter comes from, and an update on fusion research. Workshops will include making a rocket launcher, data logging and teaching active physics.

Details and booking: contact Robert Strawson (e-mail robert@strawson.net).

Manchester Science Teachers Conference

Manchester Metropolitan University

24 June

This is a free one-day conference organised by the local branch and Manchester Metropolitan University, focusing on KS4. It will include updates on current scientific developments, as well as ideas and strategies to aid classroom teachers and the establishment of an area support network.

Details and booking: visit www.mmu.ac.uk/physics2009 (from 15 March).

North East Physics Teachers Conference

Ogden Centre for Fundamental Physics, Durham University

24 June

This is a day of talks, workshops and displays, organised by teachers for teachers, in conjunction with Durham University and the Science Learning Centre NE. Fee: £5.

Details and booking: visit www.slcne.org.uk/course/physicsday or tel 0191 370 6200.

Liverpool Physics Meeting – Physics Can Be Easy!

Chadwick laboratory, University of Liverpool

25 June, 9.30 a.m. – 3.30 p.m.

This is a free day for science teachers with an emphasis on physics at KS3/KS4.

Details and booking: contact Lucas Hayhurst (e-mail LHT@blueyonder.co.uk).

Advancing Physics Teachers and Technicians Courses

Department of Physics and Astronomy, University of Birmingham

30 June: AS preparation, teachers course

1 July: A2 preparation, teachers course

2 July: AS and A2 preparation, technicians course

These courses cover all aspects of teaching and learning and are for those new to Advancing Physics, as well as those who feel the need to do a bit of catching up.

Details and booking: visit www.advancingphysics.iop.org.

Annual Liverpool Physics Teachers Conference

Chadwick Laboratory, University of Liverpool

2 July

This conference is for specialist teachers of physics and is aimed at GCSE and A-level. There will be new ideas and activities to try.

Details: contact Steve Barrett (e-mail s.d.barrett@liv.ac.uk).

IOP Yorkshire Branch Teachers Day

Department of Physics, University of York

4 July

This will be a varied day of workshops and lectures with something for all.

Details and booking: to register your interest in attending, contact Alex Brabbs, (e-mail alex.brabbs@iop.org) Institute of Physics regional officer, Yorkshire and North East.

Hull Teacher Network Day

Hessle High School

6 July

This one-day event will include a mixture of talks and workshops.

Details: contact Stephen McIntosh (e-mail physics.mcintosh@googlemail.com).

Physics Update

School of Physics and Astronomy, University of Birmingham

10–12 July

The programme is to be announced.

En suite accommodation will be available in Lucas House.

Details: contact Leila Solomon (e-mail leila.solomon@iop.org).

Residential Courses at Charterhouse

Charterhouse, Godalming, Surrey

2–3 July: A-level investigations, practicals and new techniques, including video and data logging

6–10 July and 13–17 July: physics subject-knowledge booster courses

These courses will include free accommodation, materials and food.

Details: contact Steve Hearn (e-mail: sth@charterhouse.org.uk).

East Midlands Network Day
Oakham School, Rutland
19 September
This will be a great opportunity for anyone teaching or supporting physics classes to share ideas, to get up-to-date information and to collect some free resources.
Details: contact Neal Gupta (e-mail ngupta@ockbrook.derby.sch.uk) or Helen Pollard (e-mail hjp@oakham.rutland.sch.uk).

EVENTS AND COMPETITIONS FOR STUDENTS

Institute of Physics Schools and Colleges Lecture 2009: Exploring the Universe: a Tale of Telescopes, Time Travel and Extraterrestrials
This free lecture for 14–16-year-olds, given by Dr Andy Newsam, continues its UK tour.
Details and booking: visit www.iop.org and click on "Events" under "Schools and Colleges" or contact Clare Mills (e-mail clare.mills@iop.org), Institute of Physics North Wales Teacher Network.

Wrexham Science Festival 2009
31 March, 4.30–5.30 p.m.
Dr Andy Newsam's "Hunting for asteroids" workshop for pupils and teachers will feature special observations that have been taken by the Liverpool Telescope (http://telescope.livjm.ac.uk/), the world's largest fully robotic telescope.
31 March, 7.00–8.00 p.m.
"Things that go bang in the night or exploring the dynamic universe", is a lecture for pupils and teachers. The talk will show how the UK is leading the world in the study of the changing universe.
Details: contact Andrea Fesmer (e-mail andrea.fesmer@talk21.com).

National Particle Physics Masterclasses
This is a popular series of one-day events for sixth-form students and their teachers, run by practising particle-physics researchers at various institutes across the country during March and April.
Details: visit http://www.particlephysics.ac.uk/teach.html or contact the STFC schools' officer, Gareth James (e-mail gareth.james@stfc.ac.uk).

Advancing Physics Revision Roadshow
All venues will feature sessions for both AS and A2 students.
2 April: University of Bristol
20 April: University of Birmingham
21 April: University of Durham
24 and 25 April: University College London
30 April: University of Durham (TBC)
The fee is £20 per student, which includes revision sessions, hand-outs, lunch and refreshments. Accompanying teachers are admitted free of charge. Book early to avoid disappointment.
Details and booking: visit http://advancingphysics.iop.org.

Space Academy Competition
Space Academy has up to 35 fully funded places on Space School UK to be won. The competition is open to all East Midlands students (closing date 15 May).
Details: visit www.spacecentre.co.uk/academy. For further information about Space School UK, visit www.spaceschooluk.org.

University of Birmingham Particle-Physics Competition
Students are invited to make a film or animation for the classroom that gives an insight into particle physics for their peers. There are excellent cash prizes to be won (deadline 31 May).
Details: for information about and reports on previous particle-physics events and competitions, visit www.ph.bham.ac.uk/schools/ and click on "Forthcoming Events".

University of Birmingham Residential Summer School for AS Students Studying Physics and Mathematics
15–16 July
This is the sixth year of successful summer schools organised by the University of Birmingham.
Details: for information about and reports on previous residential summer-school events, visit www.ph.bham.ac.uk/schools/ and click on "Forthcoming Events".

The March 2008 issue of *Classroom Physics* introduced the resources available from the Physics and Ethics Education Project (PEEP). The suggestions below and the worksheet overleaf might encourage you to explore the resources to help with teaching some aspects of "how science works".

Planning a PEEP lesson

Use PEEP web pages with your students for any of several purposes:
- to introduce a physics topic through a motivating context;
- to apply and consolidate recent learning of physics concepts;
- to illustrate "how science works" with technological applications or ethical implications;
- to develop learning skills;
- to teach citizenship knowledge or skills through science;
- to teach moral education.

When first using the website with students, we suggest that you focus on one particular thread, then do the following:
- Decide on the learning objectives for the lesson.
- Check that the activities on the relevant PEEP pages suit your students then amend the activities, omit some and add your own – whatever you judge will work best.
- Decide whether students will work online, from printed sheets based on PEEP webpages or perhaps both.
- Have students work in pairs or in small groups, to encourage discussion. Allocate particular pages/sections and activities to each pair or group. You may want every group to work through the whole thematic thread.
- Have a plenary where groups report on their discussions and/or outcomes.

The PEEP website is organised into thematic "threads" linking related pages. For example, the topic "Space" has several thematic threads:
- Are the costs of space exploration justified?
- What should be done about space debris?
- Is there life elsewhere in the universe?
- Scientific and non-scientific questions about space

PEEPDISC02

PEEP discussion: climate change

"Climate change is real. It is happening now and is most likely being caused by human activities."

Fiona, 34, teacher

"The scientists who say that human activities have caused climate change may be right or they may be wrong, but can we afford to take a chance? We must all act now in case they are right. We only have one planet."

You say: _____

Alexander, 15, student

"This is what the majority of credible scientists are saying. They have evidence from many different sources, such as from monitoring atmospheric carbon dioxide levels and the temperatures over many years."

You say: _____

Alan, 67, doctor

"All I know is that when I was growing up in England the weather never seemed to be this extreme. There were never any really bad storms and flooding never occurred on the scale it does now, so what's the cause?"

You say: _____

Jessica, 28, journalist

"Only some scientists claim that climate change is happening as a result of human activities; other scientists say that climate change is not occurring and others say that climate change is not caused by human activities."

You say: _____

Anton, 31, lecturer

"I accept that climate change is occurring but climate change has always occurred throughout the Earth's history. Climate change is not caused by human activity but by a mixture of many other different processes."

You say: _____

Summary: _____