

SASP news

Issue 2 April 2009

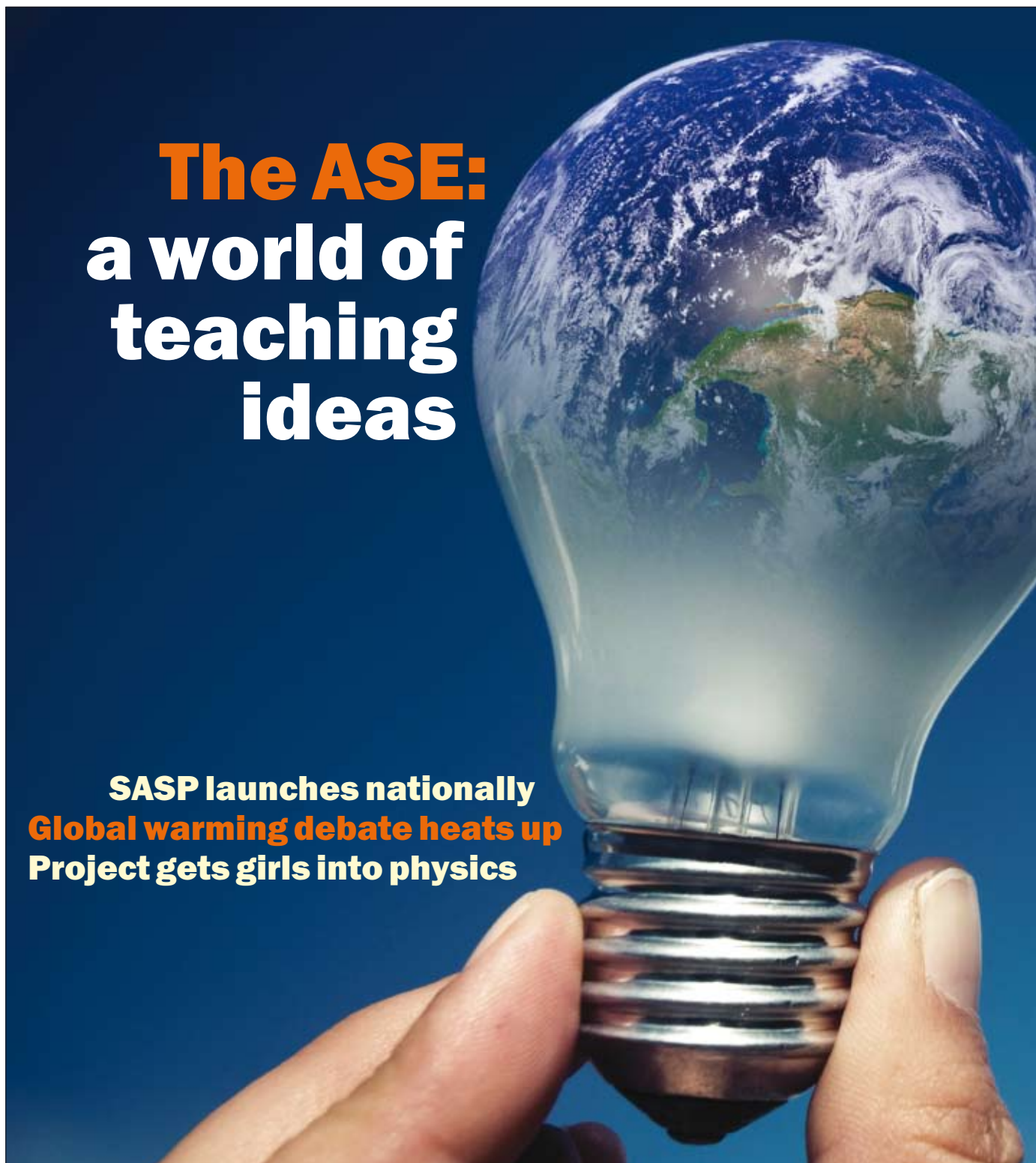
Editor Lara Ogunbawo
lara.ogunbawo@iop.org

Published by the
Institute of Physics

The newsletter for the Science Additional Specialism Programme

The ASE: a world of teaching ideas

SASP launches nationally
Global warming debate heats up
Project gets girls into physics



istockphoto

SASP springs into action



Welcome to the second issue of *SASPnews*. With any luck this issue will find those of you who are in the first SASP cohort safe and well, and enjoying teaching your additional specialism. If you are in the second cohort and you are part-way through your course, welcome to our additional support programme.



In this issue there is an excellent introduction to the benefits of becoming an RSC member and the IOP schools affiliation scheme. We also focus on the recent ASE conference at the University of Reading, with a summary of our visit explaining why this annual

event is an important occasion in the SASP calendar.

For the physicists there is an article about making physics teaching more inclusive, with an introduction to the Girls in the Physics Classroom project. Chemistry specialists are invited to consider the science behind climate change and to make use of some new and interesting RSC resources.

There is also an early reminder about the dates for the next SASP Summer Conference. Once again, all SASP participants, past and present, will be invited to converge on the fine city of York on 10–11 July 2009.

As ever, we hope that *SASPnews* is a useful and entertaining source of news and valuable information for all SASP participants. If you have any suggestions or feedback, we would love to hear from you.

Lara Ogunbawo, SASP commissioning editor

James Camp, SASP assistant editor

What's SASP all about then?

The Science Additional Specialism Programme is for teachers who need to teach physics or chemistry but don't have a degree or PGCE in these subjects. Attending the 40-day course helps them to develop a knowledge of physics or chemistry and gain some subject-specific pedagogical skills. For further details about the scheme, visit www.tda.gov.uk/teachers/continuingprofessionaldevelopment/science_cpd.aspx. The Institute of Physics (IOP), the Royal Society of Chemistry (RSC) and the Gatsby Charitable Foundation offer an additional programme of support to all SASP course participants involved in the initial two-year pilot. For further details about our support programme, visit www.iop.org/activity/education/Teacher_Support/sasp/page_33328.html.

E-learning tools enrich practical science work

A new e-learning tool is set to banish teachers' fears about "letting students loose" in the school laboratory.

The LabSkills schools' *Dynamic Lab Manual* enables the user to carry out "virtual" experiments, practise the techniques and, for the first time, make mistakes, all before they enter the classroom.

The resource is being provided free to all chemistry teacher trainees – an initiative made possible by a joint RSC and Pfizer educational project, Discover Chemistry funding and collaboration with the University of Bristol.

Kate Bellingham, newly appointed as the national STEM careers coordinator, welcomes it: "As a former *Tomorrow's World* presenter and scientific experimenter, it was fun to just 'try it and see'.

"With this software, I was able to 'blow up the lab' quite safely, learning how to avoid the same mistakes in reality. Practical scientific skills are so useful in many areas, and they are vital to future chemists.

"As a former teacher, I know that LabSkills will



LabSkills: let your students loose.

add an extremely valuable new dimension to the study of chemistry by helping to reinforce the importance of scientific rigour and of health and safety, while being informative and engaging."

The RSC will host evaluation workshops during the coming few months for users to help to identify gaps in (and improvements that could be made to) the programme, and to ensure that schools can make the best possible use of the resource.

For more details and to try LabSkills, visit www.labskills.co.uk/free-resources.php.

Announcement secures university course funding

The Higher Education Funding Council for England (HEFCE) has announced that it will make permanent an allocation of £25 m each year to secure the higher education provision of strategically important subjects, including physics, from 2010 onwards.

Subjects such as physics, chemistry and chemical engineering are more expensive for universities to offer because of the increasing cost of laboratory facilities. In 2007, HEFCE allocated

£75 m for three years to ensure the availability of university courses in these strategically important science subjects.

Peter Main, the Institute's director of education and science, said: "I am delighted with HEFCE's commitment to safeguard the long-term sustainability of university physics provision. This announcement sends a positive message of the government's support for physics and the contribution that physicists make to the UK's economy."

Affiliation scheme has a lot to offer SASP students



The Institute works hard to support all physics teachers, and SASP participants in particular are important to us. For the duration of your involvement in our support programme we have therefore arranged free membership of the IOP Schools and Colleges Affiliation Scheme. So what does this have to offer and how can it help SASP teachers? Here are a few answers to help you to get the most out of your membership.

We are currently sending *Classroom Physics*, *Physics Education* and *Physics World* to you in school. All three publications are a vast source of inspiration. They suggest ideas for the classroom and feature news about the world of physics

and physics education.

Our quarterly newsletter, *Classroom Physics*, aims to keep you informed about meetings, events for teachers and students, INSET courses, resources and other support that the Institute offers to all teachers of physics. It is sent directly to teachers in schools, but if you have missed an issue they can all be found at www.iop.org/activity/education/News/Newsletter/page_5671.html.

Physics Education is a journal for everyone involved in the teaching and learning of physics from year 7 up to introductory undergraduate level. Each issue contains articles about the teaching of physics, teaching tips, and reviews of books, software and equipment. A particularly useful feature is the electronic version (www.iop.org/EJ/journal/PhysEd), which includes extra material in the form of multimedia attachments. Worksheets, spreadsheets, computer programs and video clips are attached to each article and

can be downloaded and used in your lessons.

If you want to keep up to date with the latest physics-related research then *Physics World* will help you. It will also provide inspiration for your older students. You may find the new digital edition and searchable archive particularly useful if you are looking for cutting-edge articles with which to enthuse your A-level students. These can be found at physicsworld.com/cws/home.

The Institute's Education Department supports a number of e-mail discussion lists that are designed to provide physics teachers with a forum to share ideas, ask questions and exchange views. There are two that may be of particular interest to SASP participants. Physics Early Professional Development is a discussion list for all science students in initial teacher training or in the early years of their teaching career, and for those who have a related professional interest. Physics Teaching News and Comment is a discussion list open to all those with a

professional interest in the teaching and learning of physics. The list currently has more than 480 subscribers, leading to a reasonable pool of wisdom to tap into. Further information about both of these can be found on our website at www.iop.org/activity/education/Teacher_Support/Email_Discussion_Lists/page_5881.html.

There is much more to the Institute's Schools and Colleges Affiliation Scheme than can be described in this brief article. You can keep up to date with all of the benefits by visiting www.iop.org/activity/education/ and selecting "Teacher Support", followed by "School Affiliation".

I hope that you will find your membership a source of practical ideas and inspiration for the classroom. If you have some ideas about how our support for SASP teachers can be improved or if you have questions about the affiliation scheme, do not hesitate to contact me directly (see p8 for contact details).

Dean Park, SASP enhancement manager

RSC encourages membership to exploit its benefits



The RSC provides all sorts of support for chemistry teachers. We produce resources and careers materials, and we run competitions for school students and INSET courses for teachers. You may have taken advantage of some of these already, but have you considered becoming a member

of the organisation?

Membership provides significant support for chemistry teachers in terms of resources, networking and opportunities for development. Award-winning chemistry magazine *Chemistry World* is sent to members monthly and it is packed with information and news, which can be used to support teaching.

Members automatically become part of the local RSC section, which meets regularly and provides opportunities for networking with other members from academia, industry and public service. In addition there are more than 85 specialist interest groups

within the RSC, so individual interests can be pursued with those of a like mind.

Members get full access to rsc.org, which is a truly massive online resource that is guaranteed to assist with any need relating to chemistry. The chemical enquiries helpdesk (free to members) acts almost as a research department and is able to answer virtually any question about chemistry within 48 hours.

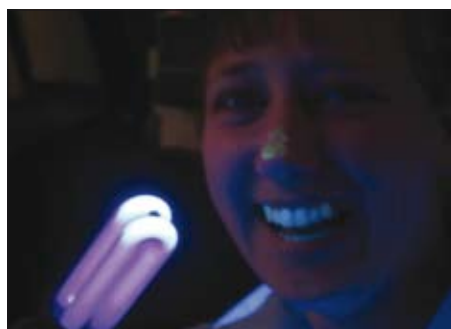
There are also numerous conferences, training courses, one-to-one services and discount schemes for members.

RSC membership is a declaration of professional status and indicates a

commitment to maintaining the highest ethical standards in the teaching and practice of the chemical sciences.

You can gain access to all of these benefits for just £65 per annum as an affiliate member. To become a full member you will need to demonstrate that your degree contained a sufficient amount of chemistry, and this is assessed on a case-by-case basis. As a full member you will also receive the designator "MRSC" letters. For more information and an application form, visit www.rsc.org/membership.

Emma Woodley, assistant education manager, schools and colleges, RSC



ASE Conference 2009 open

James Camp reports on the highlights of our visit to the event.

The beginning of January marks the biggest science education conference in the calendar – the Association for Science Education (ASE) Annual Conference. The universities of Birmingham and Liverpool have previously played host to the popular event, but this year it was held at the University of Reading, which welcomed new delegates from SASP.

On the evening of 9 January, despite the bitterly cold weather, many of our guests braved the journey and made the trip to the excellent De Veres Hotel at Wokefield Park. Set in the middle of the countryside, the secluded location guaranteed both a peaceful stay for our party and a sure-fire way of deterring any SASP participants from escaping into the centre of Reading. With everyone secured in the hotel for the night, the reunion meal provided a great opportunity for all of the delegates and regional advisers to catch up with one another before the conference.

The following day everyone met in the hotel lobby to board the coaches that had been laid on to transport participants to the conference. At this point it felt a bit like going on a school trip. Despite a late night in the hotel bar and a very early breakfast,

everyone made it down in time to catch a coach for the journey to the main University of Reading campus.

Whiteknights is impressive, modern and well laid out, and it proved to be an ideal location for the conference. There was plenty for everyone to see and do, with a varied range of stands offering all manner of goodies for eagle-eyed visitors to grab. The ASE marquee tent had a great atmosphere and the helpful staff provided seemingly endless supplies of refreshments.

In addition to the opportunities for participants to meet with their regional adviser and to visit the exhibitors' marquees, separate programmes of physics and chemistry workshops had been signposted by the SASP team.

First stop for the chemists was a lecture that explored the DNA "revolution" in policing. With the UK boasting the largest forensic DNA database in the world and scientists continuing to work at the frontiers of genetics, questions are emerging concerning ethical issues, and the efficacy of taking and permanently retaining DNA samples. This is very fertile ground for tackling many areas of "how science works". If you missed the lecture or you would like to find out more, visit <http://www.nuffieldbioethics.org/>.

Supporting the brightest students in your classroom can be a real challenge



"This was a good day. It was great to meet other like-minded people, to share ideas and to experiment with new resources."



ns up a world of resources

“The conference was superb and I found it hugely beneficial in terms of the resources and the contacts that I made there.”



if you are teaching outside your initial specialism for the first time. For this reason, Tim Jolliff’s workshop proved to be very popular with SASP participants. His session explored many of the ideas in his book *Chemistry for the Gifted and Talented*. The publication and accompanying CD-ROM provide activities for more-able chemistry pupils working in mixed-ability groups. A variety of approaches are suggested to encourage students to think about and to evaluate the chemistry that they learn. Activities include: Sudoku puzzles, practical work, concept cartoons and mind maps. The book has been sent to all SASP participants. For a complete list of all of the RSC resources to support your chemistry teaching, visit www.rsc.org/Education/Teachers/Resources/index.asp.

The Institute of Physics drop-in area was extremely popular with both physics and chemistry SASP participants, no doubt in part due to it providing warm shelter from the arctic-like conditions outside, but mainly because of the excellent range of workshops and talks that were on offer in the adjoining rooms.

Gary Williams’ vibrant “New ideas?” workshop consisted of 19 ideas that were either new or reworkings of an old gem. Gaynor Nelder presented “Software for skint schools” and provided participants with 21 bits of free software that could be

used to enliven their teaching while saving on budget. Steve Hearn demonstrated how to use Science Enhancement Programme resources to carry out fairly challenging and thought-provoking physics investigations. Other physics workshops included “Developing your teaching of electricity” and “All-day physics: breakfast, dinner and tea!”. These resources have been developed by members of the Institute’s Teacher Network, which has been established to provide support for physics teachers across the whole of Great Britain and Ireland. There are currently 27 regional network coordinators in the UK who organise local group activities and INSET. They also act as a source of information about local initiatives and activities, and they provide general help and advice in response to requests. To get in touch with your local regional coordinator, visit www.iop.org/activity/education/Teacher_Support/Teachers_Network/page_2574.html.

This event was a great success overall and there seemed to be something for everyone. Our thanks must go to the SASP participants, the regional advisers, the Institute, the ASE staff and the University of Reading for making it another great event. The SASP team will be organising another visit to the ASE conference next year and we hope to see you there.

Girls in the Physics Classroom project: how inclusive is your science teaching?

Dean Park examines the under-representation of girls in physics.

It probably won't surprise you to read that in 2007 more than 21 000 boys took physics A-level but only 6000 girls made the same choice. The proportion of girls staying with physics post-16 has remained stubbornly around the 21% mark for the last 20 years. For the UK this under-representation of girls in physics is a very serious problem because a physics qualification is a gateway to a variety of careers that make a substantial contribution to the financial and intellectual wealth of the country. Not only is this problem well known but it has been a focus of attention for some time.

So why is there still such a huge discrepancy between the number of boys and girls taking A-level physics?

With this question in mind, the Institute of Physics commissioned two pieces of work about girls' engagement with physics that led to the production of the materials included on the *Girls in the Physics Classroom* DVD. The work had two aspects: a review of the research on the participation of girls in physics and an investigation into why some schools are successful in enabling girls to engage with physics. In particular, it appears that girls are more likely to continue with physics after the age of 16 if:

- physics is taught in a way that engages with the interests of young people;
- there is an expectation that anyone can do physics;
- classrooms are managed to ensure active participation by students;
- the focus of learning is on ideas rather than unconnected facts;
- students feel supported in their learning;
- young people understand the contribution that physics makes to society and can make to their lives.

All of these suggestions simply represent good classroom practice and support both boys and girls in their learning.

Girls in the Physics Classroom: a Teachers' Guide for Action contains a wealth of guidance and practical ideas but doesn't need to be read from cover to cover. A good place to start is the checklist in appendix 4.3 where a series of questions



Forward thinking: schoolgirls engage more with supported, ideas-led practical physics work.

and prompts enable you to discover how inclusive your physics teaching really is. You will be invited to answer questions, such as:

- Have you tried single-gender groups for discussion and practical work? Have you given students specific roles during these activities to ensure full participation?
- Are students encouraged to use their own language to explain ideas, before being introduced to the specialist vocabulary?
- So that work has a clear rationale, do you make the point of following the sequence: applications; principles; applications?

If you would like to investigate this issue a little further with your own pupils or if you are the physics subject leader in your school, there are a number of other useful resources on the DVD. Two exemplar questionnaires will help you to carry out research into students' interests in science. The "Messages for Practice" in the teachers' guide will then enable you to formulate a Girls into Physics action plan informed by your research findings. The two 15 minute videos on the DVD have been designed to stimulate discussions about why more

girls do not continue with physics. The teachers' guide describes some activities to accompany the videos, which could be incorporated into your own Girls into Physics workshop.

Since the publication of these two reports in 2006, the Science Learning Centres have been working with teachers in schools throughout the UK to support small-scale action research projects to address some of the issues. A report by an evaluation team will be published by the Department for Children, Schools and Families shortly. A presentation about this work was given at the ASE Annual Conference at the University of Reading in January and the project was the lead story in the March issue of *Classroom Physics*.

The Institute of Physics resources have already been sent out to affiliated schools and all SASP participants, but if you need further copies they can be downloaded from the Institute's website at www.iop.org/activity/education/Policy/Policy%20and%20consultations/page_22188.html.

For more information about work in this area, contact Clare Thomson (e-mail clare.thomson@iop.org).

Chemists put climate change under the microscope

This year has seen some of the heaviest snowfall in parts of the UK for 20 years, and at the same time soaring temperatures in Australia. Is this evidence of climate change or just an extreme natural event? Is climate change one of the biggest challenges facing humanity or a huge swindle by the global scientific community? Is it happening at all? Is it caused by us?

There are few scientific issues that dominate the headlines in the way that climate change does. All students will have heard of it, many will have opinions about it and some may be trying to live differently to try to mitigate its effects.

However, the issue is a complex one and often the information presented can appear to be conflicting. There are a great deal of data out there, which can help to make sense of the problem, but wading through them can be daunting. So how do you go about introducing the subject into your chemistry teaching?

The RSC has worked with climate experts to produce resources for teachers of 14–16- and 16–18-year-old students. These take up-to-date data and show you how to use it in the classroom to support the teaching of “how science works”. The emphasis is on the science of climate change – what data are available, how they are collected and how they are interpreted.

Media reporting on the issue tends to focus on the extremes of opinion or the direst consequences for our civilisation of changes to the environment. It is probably fair to say that the consequences of the policy makers getting it wrong are potentially devastating, whether climate change is happening or not.

There are conflicting demands on governments from environmental groups, big business and motoring organisations, among others, all of whom have pressure groups trying to dominate the headlines



The climate change debate heats up: as another iceberg melts, are we any nearer to the truth?

with their point of view. Each has a “scientist” to speak for them or claims that science supports their point of view. Many claim that the others are biased.

Through all of this there are the demanding conflicts of our national interest – the need to try to maintain our place in the world and our standard of living against the need to make the world a place where all citizens can live.

There are moral arguments. Should we tie our promises of aid to desperately poor countries to their promise to keep their emissions at low levels, effectively denying them electricity and other modern amenities, while at the same time failing to decrease our own carbon emissions?

There are the growing economic arguments, too. Lord Stern concluded in a review for the UK government in 2006 that failure to invest now in avoiding the worst effects of climate change could cost us dearly in the long term.

This is not an issue in which any one person or country can be effective in isolation, so should we try to lead a “low-carbon life” when doing so individually is likely to make no difference to the global picture?

“So how do you go about introducing the subject into your chemistry teaching?”

The United Nations was sufficiently concerned that in 1988 it set up the Intergovernmental Panel on Climate Change (IPCC), made up of scientists who review the research that is published on the subject in academic journals worldwide. The IPCC has been criticised for being too cautious about the potential effects of climate change and also for stating the case too strongly. Its *Fourth Assessment Report*, which was published in 2007, concluded that it is 95% certain that humans are causing the global climate to change.

Although it is a familiar issue, climate change is perhaps not particularly well understood. The chemical sciences have much to contribute to our understanding. From explaining why it is that carbon dioxide and other gases cause the warming of our planet through analysing ancient ice cores, to finding out how the concentrations of these gases have changed over time and helping to construct models to predict what might happen in the future, chemical scientists are involved in current research in many areas.

The RSC resource covers many of these areas by describing the research undertaken and enabling students to use their chemical knowledge to explore this interesting topic. It aims to equip students to understand better the media reports that they read and to inspire them to study the chemical sciences further.

The complete RSC climate change resource entitled “The chemistry of climate change” includes worksheets and teachers’ notes, and it is available for download as a PDF from <http://www.rsc.org/Education/Teachers/ClimateChange/index.asp>.

TDA rolls out SASP across UK

From summer 2009 the Training and Development Agency for Schools (TDA) is launching SASP nationally. The course is free for participants and the TDA will fund supply cover for participating schools.

SASP has been piloted successfully in three regions since summer 2007, and it has made a big difference to the professional development of the teachers involved.

The positive feedback has included: "I used to stick to the textbook. Now, thanks to the pilot, I am knowledgeable and confident enough to be far more creative in my teaching."

A challenging and inspiring course, SASP has helped participants to become more informed and imaginative in the way that they teach physics.

One teacher said: "I am



Science teachers enjoy the benefits of enrolling on the SASP course.

much more inspired and I am able to inspire my pupils more as a result. For example, in a recent lesson my pupils made crash-test dummies using eggs. They had a great time testing them out – there was egg all over the place. Among all of the mess they learned a heck of a lot about physics."

In addition to gaining new

skills, successful participants meeting eligibility criteria will receive a £5000 incentive on completion of their course.

Even more physics and chemistry teachers have the opportunity to take SASP courses in 2009. For full details of participating institutions and a comprehensive list of course contacts, see below.

INSTITUTIONS RUNNING SASP COURSES

North East

Science Learning Centre North East

Chemistry contact: Mike Cole (tel 0191 370 6200, e-mail mike.cole@durham.ac.uk).

North West

Edge Hill University

Contact Jane Morris (tel 01695 584 660, e-mail morrismj@edgehill.ac.uk).

University of Cumbria

Contact Nigel Appleton (tel 01524 384 470, e-mail nigel.appleton@cumbria.ac.uk).

East Midlands

Science Learning Centre East Midlands

Chemistry contact: Elaine Hodkin (tel 0116 252 3695, e-mail eh99@le.ac.uk).

West Midlands

Keele University with the Science Learning Centre

Contact Charles Phillips (tel 01782 734 439, e-mail c.l.phillips@slcwm.ac.uk).

South East

Universities of Brighton and Sussex partnership

Physics contact: Peter Adamczyk (tel 01273 877 041, e-mail p.adamczyk@sussex.ac.uk).
Chemistry contact: Brian Marsh (tel 01273 641 901, e-mail b.marsh@brighton.ac.uk).

South West

Science Learning Centre South West

Chemistry contact: Fiona Everitt (tel 0117 915 7143, e-mail fiona.everitt@at-bristol.org.uk).

London

Science Learning Centre London

Physics contact: Fani Stylianidou (tel 0207 612 6325, e-mail f.stylianidou@ioe.ac.uk).

East of England

Science Learning Centre Eastern

Physics contact: Alison Redmore (tel 01992 503 498, e-mail a.m.redmore@herts.ac.uk).

Yorkshire and Humberside

Science Learning Centre Yorkshire and Humberside

Physics contact: Heather Wain (tel 0114 225 4891, e-mail h.wain@shu.ac.uk).

For more information about SASP, visit http://www.tda.gov.uk/teachers/continuingprofessionaldevelopment/science_cpd.aspx.

NATIONAL EVENTS

SASP Summer Conference
National Science Learning Centre
10–11 July 2009

Association for Science Education Annual Conference
University of Nottingham
8–9 January 2010

Spring workshops (physics)
"Whiz-bang physics"
University of Edge Hill
24 February 2009

A-level workshop (physics)
University of Brighton
21 March 2009

The physics of Alton Towers
University of Keele
16 May 2009

SASP enhancement team contact details

Dean Park
SASP enhancement manager:
dean.park@iop.org
Lara Ogunbawo
SASP project coordinator:
lara.ogunbawo@iop.org

SASPnews is published by IOP Publishing Ltd

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The Institute of Physics,
76 Portland Place,
London, W1B 1NT, UK.
Tel +44 (0)20 7470 4800
Fax +44 (0)20 7470 4848

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