76 Portland Place, London W1B 1NT UK
Tel: +44 (0)207 470 4816
www.stimulatingphysics.org

Stimulating Physics Network National CPD Conference

Supporting the Teaching and Learning of Physics
The Institute of Physics, Portland Place, London.

Programme

Thursday 17th June 2010

1000 - 1030 Registration, tea and biscuits
1030 - 1100 Welcome and outline of the meeting.
Overview of the SPN:Targeted support and the Ever Wondered Why? Roadshow; the Physics Teacher Network
1100 - 1200 The role of the Teaching and Learning Coaches
1200 - 1300 Workshop: Systematic and strategic support for teachers of Physics
1210 - 1300 Lunch
1300 - 1400 Workshop: Beyond forces and electric circuits.
1400 - 1500 Workshop: Ashfield Music Festival
1500 - 1700 Workshop: Rocket Launchers - make and take
Evening Pub quiz

Friday 18th June 2010

1000 - 1030 Registration, tea and biscuits and IOP resources
1030 - 1300 Choice of science visits: Royal Institution; 3B Scientific Teltron Tube factory…
1300 - 1400 Lunch
1400 - 1520 Workshop: Engaging with Girls – increasing the participation of girls in physics
1520 - 1535 Tea and biscuits
1535 - 1700 Workshop: Energy lends a cohering hand
1800 - 1830 Tea and coffee
1830 - 1930 Lecture – Professor Phil Scott, Leeds University
1930 - 2000 Aperitifs and canapés
2000 Conference Dinner at the IOP

Saturday 19th June 2010

1000 - 1030 Registration, tea and biscuits and IOP resources
1030 - 1130 Talk – Speaker TBC
1130 - 1230 Workshop: Software 4 Skint Schools
1230 - 1330 Lunch
1330 - 1400 Talkphysics
1400 - 1430 Workshop: Models galore - but which to use, and why?
1430 - 1440 Tea and biscuits
1440 - 1530 Workshop: Supporting the supporters
1530 - 1600 The Ever Wondered Why? Roadshow, with David Richardson

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Further details
You will be provided with resources associated with the following sessions free of charge:

Teaching and Learning Coaches – as part of the Stimulating Physics Network the 23 TLCs are working with around 12 schools each providing more intensive support for those teaching physics often in schools where there is no physics specialist.

Supporting Physics Teaching - this initiative is intended to support specialist and non-specialist teachers who teach physics in the early years of secondary education. The first phase developed materials for teachers of the 11-14 age group. Materials for teachers of the 14-16 age group are in preparation.
The resources are designed to help teachers to gain a better understanding of physics, to allow them to experience for themselves something of its fascination and to develop greater confidence in their teaching of it.
The essential features of the package are a set of structured resources, which can be used by training providers as a basis for in-service training programmes or by teachers as a stand-alone training resource.

Workshop: Systematic and strategic support for teachers of Physics
Systematically and strategically supporting teachers of physics, most of whom have chosen to leave the study of physics or cognate subjects well before degree level, presents significant challenges. One such is in developing the teachers subject knowledge so that they can:

- be confident in dealing with unknown situations
- exemplify thinking with physics
- be competent in their own reasoning
- be able to make informed professional judgements in connecting the physics with their classes.

Without doubt those present will have faced some of these challenges. In this opening session we'll explore how these have been met, how they might be met in future, and how resources from the IOP might help.

Workshop: Beyond forces and electric circuits
Research into teaching and learning about these two topic areas has shown many different and persistent ideas - likely to be present in teachers as well as pupils, so you can easily run workshops on these topics. Changing beliefs and practice may be harder. But what next, and how do theses ideas build into other areas? Are the ideas in electric loops really useful? And as for force arrows...
Workshop: Energy lends a cohering hand

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How do the SPT materials hold together: is energy really a key idea? And if so, then why is that the case? Is coherence really all it's cracked up to be, and how does incoherence undermine the representation of physics to the learners? Here we'll chart dangerous waters, trying both to stem the ebb and flow of the transform / transfer tides, and other attempts to solve issues by simple selection of the right words and show how a principled and coherent approach can leave all feeling less nervous about teaching energy.

Workshop: Models galore - but which to use, and why?
How can we decide how to teach topic "x"? What works for us? What the specification dictates? Or a more broadly based approach. Here we'll inspect the skeleton of SPT and see it gets fleshed out.

Workshop: Supporting the supporters
Where to next? Supporting and developing the supporters. Critical feedback and critical engagement. Oh, and a bit of physics, for pleasure.

Ashfield Music Festival – Developed by the Institute of Physics (IOP) and the Career Development Organisation (CRAC), Ashfield Music Festival is a one-day off-timetable activity designed to develop skills in work-related learning and inspire more students to study physics post-16. This activity is a simulation, based on the scenario that a council (Ashfield) wants to create a new music festival. The students develop skills in enterprise and learn how physics applies in this engaging context by taking on different roles such as project manager or sound engineer. This workshop is a taster session and provides an introduction to running the activity in a school.

Rocket Launchers Make-and-take – Physics Network Coordinators have helped put over 1000 rocket launchers in schools. Now you can make your own to take away and see a typical Network workshop. Rockets are made out of paper and sticky tape but will easily travel the length of a rugby pitch if your rocket building skills are up to the task.

Engaging with Girls – increasing the participation of girls in physics
The Institute of Physics has been concerned for many years about the small percentage of girls continuing with physics post-16. The need to promote the engagement of girls with physics; to foster in them more positive attitudes, and an understanding of the relevance of physics to their daily lives, remains a priority. In 2006, a *Review of the Research on the Participation of Girls in Physics* and *A Teachers' Guide for Action* were published. These publications have been widely used by teachers and others to help inform change in schools and classroom practice and organisation, with benefits for all students in their care. This workshop draws on the experiences of those schools.

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Software 4 Skint Schools
20 bits of free software that you could use in school to enliven your teaching while saving your budget. Schools are often bombarded with adverts for software by companies that have the money to invest in advertising. People who produce free software are, of course, unlikely to be able to publicise their products to the same extent. Software 4 Skint Schools is a session that can consist of:

* a half hour PowerPoint presentation very quickly mentioning each of the 20 bits of software and what they do.
* a demonstration of some of the packages.
* with prior arrangement 5 or 6 teachers can be sent one of the software packages in advance and they can then describe it to the other workshop participants.

At the end of the session the participants get a CD with all 20 pieces of software on (installation files, internet shortcuts and copies of the home pages where the software came from).
We have permission from all the authors of the software to be able to distribute the material in this way and also for participants to go back to their school, deliver the PowerPoint (which is also included on the CD) and copy the CD for other teachers attending their session.
Please note: All the software is freely available on the web.

TalkPhysics
Social Networking has become increasingly popular and the IOP recognizes how useful a tool it could be for helping spread good practice. TalkPhysics is the IOP Education Department's social networking website that provides a means of communication as well as delivery of the SPT materials.
This is a site to bring together those who want to support the teaching of physics. www.talkphysics.org

Professor Phil Scott
Teaching Physics Concepts: A Neglected Art?
Phil Scott is Professor of Physics Education and Director of the Centre for Studies in Science and Mathematics Education (CSSME) at the University of Leeds (UK). He is also Visiting Professor in Physics Education to The Norwegian University of Science and Technology (NTNU), Trondheim, Norway. Prior to working at the university Phil Scott taught physics/science in high schools for 15 years. Current interests lie in planning and evaluating approaches to teaching physics conceptual knowledge, focussing in particular on the patterns of talk in the classroom. Phil Scott is currently co-editor of the journal Studies in Science Education and an elected Executive Board Member of the USA National Association for Research in Science Teaching (NARST). Away from physics education, Phil is a lifelong fan of Sunderland Football Club and a keen mountain biker.

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"There is never any shortage of new developments in the world of physics education and teachers are remarkably adept at dealing with the latest trends in approaches to teaching. Thus in the recent years we have new developments related to: inquiry/investigation-based approaches to teaching; argumentation in science education; how science works; ICT-based independent learning; approaches to authentic science instruction. The list is a long one which appears to refresh and re-new itself on a regular basis.

In some ways this is a good thing. Professional perspectives change and things move on, hopefully in a positive direction. The concern which I do have, however, is that 'new' approaches such as these tend to 'take away' from the fundamental job of teaching and learning scientific conceptual knowledge.

A worrying trend that I detect sees new approaches being set up in opposition to each other in an unhealthy dichotomy: thus investigative or inquiry-based approaches are seen as an alternative to 'traditional' ways of teaching science concepts. Furthermore, and all too often, approaches to teaching scientific conceptual knowledge are cast as being 'traditional', 'didactic' and 'bad', whilst inquiry approaches are seen as being 'innovative', 'child-centred' and 'good'.

My own view in these matters is that there is an appropriate place for all of these forms of teaching: it just depends on what the teacher is trying to achieve. For example if the goal is to teach about the representation of forces as arrows, it would not make sense to employ an inquiry based approach. At the same time, it is the responsibility of the teacher to teach about force arrows in an accessible, and interesting way which supports meaningful learning by the student. This is quite different to the 'traditional' ways of 'just telling'.

In this presentation I shall explore some of these ideas, emphasising the importance of teaching physics concepts in an engaging way and making the case for moving away from harmful dichotomies in talking and thinking about teaching."

Trips

Royal Institution

The Royal Institution is an organisation that has been around for 209 years. Many of the people that have worked at the RI have been scientists themselves, including Michael Faraday.

3B Scientific Teltron Tube factory

We will take the tube (the underground one not the Teltron) to Park Royal where the technicians from Teltron will show us the process by which Teltron Tubes are made. This is a fascinating process with the tubes being almost entirely hand made. We'll see the electron guns being made, glass being worked and the tubes being baked.

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Location
The conference will take place at the Institute of Physics, 76 Portland Place London W1B 1NT, UK. For further details of the location see: http://www.iop.org/aboutus/Contact_Us/The_Institute_of_Physics_London/page_3591.html

Cost
The conference is free to attend but accommodation and travel are not included. Delegates will need to organise this themselves.

Accommodation and a list of places to eat can be found on the Stimulating Physics website: http://stimulatingphysics.org/events.htm

Registration is via the website at: https://www.eventsforce.net/iop/91/register

Enquiries should be directed to either gary.williams@iop.org or edwin.miller@iop.org