IOP Institute of Physics
Education Supporting Teachers

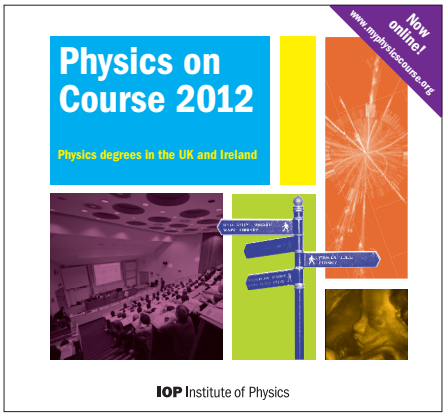
Classroomphysics
The newsletter for affiliated schools
September 2011 Issue 18

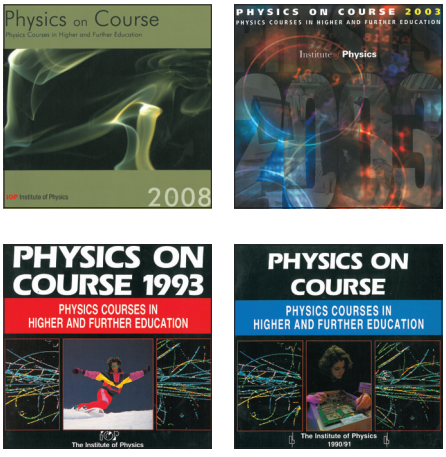
New site launched to celebrate 21 years of 'Physics on Course'

myphysicscourse.org | Finding the right degree | IOP Institute of Physics | The Ogden Trust

Physics on Course is 21 this year. Updated annually, this publication lists all physics and related undergraduate degree courses in the UK and Ireland, along with their entry requirements. Over the last two decades, this publication has become essential reading for any student considering studying physics at university. As well as degree listings, *Physics on Course* provides advice on choosing a degree course and careers beyond a physics degree. There are also more details about individual university physics departments and their courses. All schools and colleges with a sixth form will receive a copy of *Physics on Course* in September.

To celebrate the coming of age of *Physics on Course*, the Institute, working with the Ogden Trust, has developed a parallel website: *myphysicscourse.org*. The new website offers students greater flexibility when it comes to searching and comparing courses. Not only can students look up a particular university, they can also browse courses by subject combinations – one click, for example, brings up all courses that combine physics with geophysics or physics with a year abroad. There are 23 such course categories by which students can browse, making this a very powerful additional search tool. Students can search by grades required for entry or by distance from a given postcode. This may be particularly useful for students who want to keep their level of debt to a minimum by living at home while studying. The website also features an advanced search feature allowing students to search by multiple criteria.





Past-and-present front covers of the Institute of Physics publication Physics on Course.

This publication has become essential reading for any student considering studying physics at university.

New for 2012 in *Physics on Course* and on *myphysicscourse.org* is the inclusion of Integrated Sciences (IS), a modern interdisciplinary course offered by the universities of Leicester, London South Bank and Bradford. Combining physics, chemistry and biology, this degree may appeal to students that are either unsure of which of the sciences they want to continue with at university or those that are keen to develop a multidisciplinary approach to problem-solving. Although the "flavour" of the course varies between the universities, all IS programmes have a strong focus on transferable skills to help graduates enter the workplace. 2012 also sees the inclusion of a physics department's JUNO rating in *Physics on Course*. The Institute's Women in Physics: Project Juno allows for universities to be awarded one of three levels (supporter, practitioner or champion) when they take steps to be more inclusive and ensure equality of opportunity for all staff and students.

With the changes in the funding structure to be introduced by universities next year, it is important that students have access to the best possible information when making such an important decision as going to university. We hope that *myphysicscourse.org* will be a significant tool in helping to support widening access to university physics degrees.

For more information: visit the new site at www.myphysicscourse.org. Download a PDF of *Physics on Course* at www.iop.org/physicsoncourse. For more details about IS, visit www.integratedsciences.org.uk.

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Editorial

Welcome to the first edition of *Classroom Physics* for the new school year. I hope that you have returned from a well-deserved break feeling refreshed. We have news of one teacher's "what I did in my holidays" experience at the Honeywell Space Academy (p5); you might want to apply.

Our front-page story celebrates the launch of *myphysicscourse.org*, which aims to provide the best information possible to students looking for an undergraduate physics degree course.

In July we had a successful event to celebrate the largest cohort of physics NQTs entering the workforce for a generation (p3). We hope to be able to meet more of you over the coming year and there is news of our presence at the ASE Annual Conference (p2). With the national curriculum under review, we also have news of our ambitious curriculum-mapping project (p3). Teachers from the Education Forum have already been involved with this work.

There is an update for our Supporting Physics Teaching (SPT) project, with the forces section now available as webpages (p2). SPT is a set of structured resources to help teachers develop a greater confidence in their teaching of physics. Although the successful SASP courses are not continuing in their current form, subject-knowledge enhancement courses in physics are continuing to be available at various centres (p2).

SciCast Physics challenges young people to explain a principle of physics in an entertaining way to non-scientists. The number of entries continues to grow and we have news of this year's winners (p5). The National Physical Laboratory is also inviting entries to its film competition (p7). Other opportunities for extracurricular activities include the Big Bang Fair and the National Science and Engineering Competition (p7), and *I'm A Scientist, Get Me Out Of Here!* (p4). Students might also be interested in the Headstart programme of university taster sessions (p7) and, for the most able, the British Physics Olympiad (p4).

Details of practical physics videos are on p4 and our teaching tip (p8) is a practical activity to introduce students to the language of measurement.

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

SPT materials are now webpages

Material on the topic of forces from the Institute's Supporting Physics Teaching (SPT) resource has recently been made available as a set of webpages. These are designed for online access by teachers of physics and they will allow physics specialists to follow the arguments, explore the interactive elements and download the support worksheets more easily. The entire topic on forces is still available for download as interactive and hyperlink-rich PDF files.

Ian Lawrence, the SPT national coordinator and developer of the resources, is keen to receive feedback from teachers of physics. If you have any comments or suggestions based on your experience with the content of the webpages, the forces group on *talkphysics.org* is the place to go to air your views.

For more information: and to access the SPT material on forces, visit www.talkphysics.org and log in or register. Select the link on the left-hand side of the page to browse the SPT forces topic in webpage format.

IOP works hard at the ASE Annual Conference

The Association for Science Education Annual Conference will be held at the University of Liverpool next year on 5–7 January. This conference is the largest meeting of science teachers in the UK and its mix of lectures, workshops and exhibition make it great value CPD. The Institute's education department will be there in force and we look forward to meeting as many of you as possible.

As well as the chance to talk to the team about all that we offer to teachers and schools, we will have our usual resources-filled stand in the exhibition tent. Our Physics Network coordinators and Teaching and Learning coaches will be offering a wide range of booked courses throughout the three days of the conference. These are free but places are limited and need to be booked in advance. They range from "Seeing inside the body" to "Demonstrations to support teaching the electromagnetic spectrum".

Friday 6 January will be a particularly busy day, with the IOP John Lewis lecture given by Dr Lucie Green from the Mullard Space Laboratory on "The highs and lows of solar activity and why we should care", followed by a lunchtime reception. Teachers from affiliated schools are cordially invited to this event. Immediately after this, the ever-popular "Best of *Physics Education*" lecture–demonstration will take place. In addition, there will be sessions on "Engaging with girls" and "Making more of your physics demonstrations" among others.

Institute of Physics

A teacher gets advice at the Institute of Physics stand at a previous conference.

We do hope that many of you will come for at least part of the conference – rest assured that you will go away with a head full of new ideas and a bag full of new resources to support your teaching and engage your students.

For more information: To find out more and to book your place at the conference, visit www.ase.org.uk/conferences/annual-conference.

New courses for returners and non-physicists

If you were not originally trained as a teacher of physics or are returning to work and would like to refresh your physics subject knowledge, the Training and Development Agency (TDA) is now funding courses for teachers who wish to strengthen their physics subject knowledge. These courses will be available in the autumn term at a number of centres around the country. The training will typically combine practical sessions at the centre and distance-learning sessions but content and duration will vary according to the provider. Similar courses are being offered in chemistry and mathematics.

For more information: visit www.iop.org/teacherscpd.

Teacher recruitment at a much-needed high

The Institute of Physics dedicated 14 July to celebrating this year's cohort of new science teachers as they completed their initial teacher education. This group was special because it contained the highest number of physics specialists for 30 years. The aim of the day was to ensure that these teachers, whatever their specialism, knew about the Institute's teacher support and understood how much their role was valued by the physics community, policy-makers and beyond.

The day began with the Institute's first-ever conference for newly qualified teachers (NQTs) and came to a close with a drinks reception in the House of Commons where the Minister for Schools, Nick Gibb MP, spoke of the government's commitment to getting a steady supply of high-quality physics graduates into teaching.

More than 100 NQTs attended the conference at the Institute's London headquarters. The programme included taster demonstrations from IOP Physics Network coordinators (PNCs), a presentation on the Institute's support for teachers and its policy work, and show-and-tell discussion groups. The conference ended with presentations from a teacher of physics who had just completed his NQT year and an experienced biology teacher who had acquired physics as an additional specialism.

Institute of Physics/Richard Lewis

Minister for Schools Nick Gibb MP (second from left) and a group of NQTs enjoy a demonstration on refraction given by Physics Network coordinator, Dr Carol Davenport.

Later on at the parliamentary reception, the NQTs made up over half of the 200 guests mingling with policy-makers, science promotion bodies and funders, and the press. The PNCs repeated their demonstrations bringing physics into the House of Commons.

The day also saw the launch of the Institute's support programme for student teachers and NQTs: Learning to Teach Physics.

For more information: about the Learning to Teach Physics programme, visit www.iop.org/education/trainee.

IOP begins mapping the physics curriculum

The Institute has embarked on a major new project to map the curriculum of physics. Our aim is to provide a resource for teachers, teacher trainers, curriculum developers and awarding organisations that will help them to improve children's experience of school physics.

At the heart of the curriculum map will be a data structure covering all of physics at school level; we realise that this is ambitious. As well as statements about physics knowledge, there will be other types of data, including practical work, apparatus, teaching activities, performances and ways of thinking.

All of this data will be interlinked. For example, a statement such as "light travels in a straight line" will link to prior and subsequent knowledge statements, showing how it fits into the narrative of how light travels; it will also link to other aspects of learning (practical work, tasks, ideas about science etc) relating to that snippet of physics.

We are hoping that it will be possible to use the map to find different pathways through, say, 14-to-16 physics, each of which forms a coherent and useful set of ideas and tasks.

Charles Tracy, the Institute's head of education, discusses physics statements with a group of teachers at a curriculum-mapping workshop.

This is a long project and we are right at the start of it. We hope that the first outputs will begin to appear in late 2012 or early 2013. Those outputs might include an online tool (something like a visual thesaurus), a desktop application and a printed publication. We anticipate that the electronic versions will be the main products as they will allow users to search and filter the data, configure the tool for their own needs and build their own maps.

Finally, and possibly most importantly, the curriculum map will not be fixed – it will be a permanent beta. Our hope is that it will be an involving and evolving community tool for describing, developing and improving school physics through national (and international) discussion.

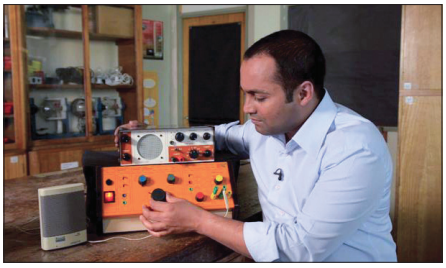
Charles Tracy, head of education, pre-19

For more information: If you would like to be involved with the project, join the Institute's Education Forum at www.talkphysics.org.

Teachers welcome practical-physics videos

If you are worried about using some pieces of physics equipment or getting some demonstrations to work successfully, the new set of videos produced in collaboration with the National STEM Centre is here to help. The videos are made by the same team as the first set, with Alom Shaha as the presenter and additional teacher/technician notes provided by David Sang, editor of *practicalphysics.org*.

As before, each video shows how to set up and use a piece of equipment, such as the signal generator or demonstrate a key phenomenon, such as the photoelectric effect or Brownian motion. The videos are aimed at teachers and technicians, rather than students, and offer clear advice on using equipment with confidence, as well as explaining the physics in a clear way. Each of the eight videos in the collection has associated teaching notes, which give details of the apparatus and useful links.



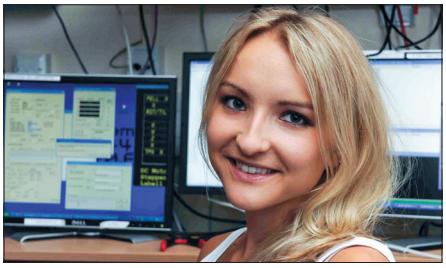
Alom Shaha demonstrates the signal generator.

We think that these short videos will be particularly useful if you are newly qualified or not a physics specialist and want to develop your repertoire of physics practical work. You may not have seen the bin-bag capacitor, homopolar motor or fire-piston before but after watching these clips you should be able to add these activities to your list of engaging practicals.

For more information: visit www.talkphysics.org/demos, www.practicalphysics.org or www.nationalstemcentre.org.uk to view the videos and download the teaching notes.

Young members vote for their top scientist

In June the Institute's 16–19 members, in addition to a number of classes from affiliated schools, were given the opportunity to take part in *I'm A Scientist, Get Me Out Of Here!* This online *X-Factor*-style competition runs over two weeks, twice a year and allows students to submit questions about anything and everything to working scientists. The scientists who reply with the best answers as judged by the students make it through to the next round – until only one scientist remains to claim the £500 prize. The winner of the Institute's quantum zone in June was Ceri Brenner (a plasma physicist at the Rutherford Appleton Laboratory).



Ceri Brenner, winner of the quantum zone in the June 2011 I'm A Scientist *competition.*

We asked one of our 16–19 members what it was like to take part. Victoria Gale gave us her perspective: "An impulsive click of the mouse and I was registered for *I'm A Scientist*. What had I let myself in for? Well, it turned out that I was in for a fun-packed, stimulating fortnight. Finding out what the five scientists in my zone were investigating, and what their jobs were like, was really exciting. The chat session was fantastic too. It was a wonderful opportunity to really get to know the scientists who'd been working so diligently to answer all of the questions, and to interact with other students."

Empowering students and giving them the freedom to ask what they want (within a moderated forum) has proved very effective in engaging students and challenging stereotypes. The Institute will be co-sponsoring the event again next year and will be offering schools and 16–19 members the opportunity to take part.

For more information: about the Institute's 16–19 membership, visit www.iop.org/16-19. To find out how your students can take part in *I'm A Scientist, Get Me Out Of Here!*, visit www.imascientist.org.uk.

The BPhO helps to stretch physics students

The British Physics Olympiad (BPhO) works to encourage the study of physics and recognise excellence in young physicists through five annual competitions: the British Physics Olympiad, A2 Challenge, AS Challenge, Physics Challenge and the Experimental Project. The competitions test students' understanding of the principles of physics taught in school years 11–13 (GCSE to A2 or equivalent).

This year more than 5800 students participated in the competitions and an evaluation of the BPhO in November revealed that teachers felt taking part was useful to "stretch and challenge" their students and "well worthwhile for stronger students who rather enjoy less obvious questions". The papers give an opportunity to practise answering open-ended and unstructured questions, as seen at higher levels of study. They also aim to show the real-world problem-solving potential of physics.

The competitions help able students to test and demonstrate skills and knowledge.

Robin Hughes, a secondary-school teacher and chair of the BPhO, highlights why he got involved: "Able students enjoy the challenge of solving harder problems, which can require considerable time, thought and skill. There is great satisfaction to be obtained from being successful in reaching the answer to a difficult physics problem". Achieving a bronze award in the A2 Challenge (formerly Paper 2), for example, is an excellent achievement. Robin adds: "Students should realise that this award puts them among the strongest physics students of their age in the country."

The competitions also inspire students to want to try out and discuss some of the ideas in past papers as preparation. Keith Caulkin from Liverpool Blue Coat School runs an after-school club and notes: "With about three or four workshops during the weeks prior to the Challenge, the skills of the students increase markedly in tackling the novel questions, where they have to apply physics' principles to unusual situations". He adds: "The buzz of talking physics and debating ideas within the groups is quite amazing. They soon acquire a strong appetite for the questions and confidence is engendered."

For more information: visit the British Physics Olympiad website at www.bpho.org.uk. The Experimental Project for 2011/12 is now available. Past papers are also available on the BPhO website. The Physics Challenge and AS Challenge cost £2 per student to enter. The British Physics Olympiad costs £18 per student, but schools that have not entered before can claim two free entries.

SciCast award-winners announced

Physics films again dominated the SciCast Awards in 2011, scoring accolades including the coveted "Best Film".

SciCast, a film competition aimed at students and young people across the UK and Ireland, invites budding film-makers to submit short and entertaining films that explore science and engineering subjects. This year, 13 award categories were featured, including the IOP-supported Best Physics Films. Other categories celebrated biology, chemistry, engineering, Earth science and the environment, with special awards for creative and technical achievement, demonstrations, original score and presentation.

The Laser, made by lower sixth-former Chris Munro from St Albans School, with graphics help from his younger sister Alison, scooped the Institute's Best Physics Film (Secondary) and Best Film (Secondary). The film explains how lasers can be used to play CDs or even to shoot down a hostile alien battle fleet. The winner of the IOP Best Physics Film (Primary) was *Magic Pencil... or not?* from South Lake Primary School in Wokingham. The film explores refraction at interfaces between glass, water and air.

For more information: visit www.scicast.org.uk/films to watch all of the film entries, including those from previous years. For the full list and links to winning films, visit www.scicast.org.uk/winners/winners-2011.html.

Nick Forwood in front of the space shuttle Atlantis *at the John F Kennedy Space Center.*

Astronaut teachers wanted for space academy

The last space shuttle, *Atlantis*, has landed and the manned US space initiative has drawn to a close – well, not quite. There will still be a need for astronauts to travel to the International Space Station (albeit on Russian launchers) and commercial space flight is just taking off – if you will excuse the pun. Richard Branson's *Virgin Galactic* is taking bookings and there are teachers in the US signed up for an initiative, which will have them carrying out experiments on sub-orbital flights within three years.

Nick Forwood, a teacher of physics from Fortrose Academy, Scotland, has just returned from the US where he spent a week training to fly into space and discovering new activities to inspire the next generation of hopeful schoolchildren. This 2011 trip was the Honeywell Advanced Space Academy for Educators and 28 teachers from around the world were attending the programme at the Space and Rocket Center in Huntsville, Alabama.

But let's wind the clock back two years to when Nick attended the 2009 Honeywell Space Academy. He applied online and was accepted onto an all-expenses-paid, week-long scholarship package, which included: simulated shuttle launches and landings; Hubble Space Telescope repair missions; experimental classroom work; museum visits; and, the chance to network with 120 other similar-minded teachers from various countries. On his return to the UK, Nick integrated a number of new activities into a first-year (year-7) secondary-physics topic called "Mission to Mars", which included the IOP rocket launcher, an egg lander and the IOP dragster racers. This gave his school a new eight-week teaching unit.

This new topic was submitted back to Honeywell by Nick in support of his application for the advanced week in 2011. Underwater sub-aqua astronaut training and a visit to space shuttle *Atlantis* on the launchpad at the John F Kennedy Space Center were just a few highlights of his return visit.

For more information: Applications are currently open. If you wish to apply for the 2012 Honeywell Educators Space Academy, visit www.spacecamp.com/educators/honeywell.

Events

EVENTS FOR TEACHERS

ASE London Conference
Science Learning Centre London
24 September
ASE London is holding a one-day conference for all teachers of science from primary to post-16. The focus of the event will be on curriculum, progression and achievement. There is a charge of £50 for ASE members and £75 for non-members.
Details and booking: visit www.slcs.ac.uk/network/lnc11368.

Irish Teachers of Physics Annual Conference: Frontiers of Physics 2011
Department of Life and Physical Sciences, GMIT Galway
24 September
This conference aims to inform teachers of the exciting and innovative work at the frontiers of physics that is being carried out in Ireland; provide teachers with examples of simple and inexpensive physics demonstrations; and inform teachers of the latest developments and resources available in physics teaching.
Details: visit www.iopireland.org or contact Paul Nugent (e-mail paulnugent@eircom.net).

Physics Experience Day for Newly Qualified Teachers
Imperial College London
30 September, 9.30 a.m. – 5.30 p.m.
This day of lectures, lab tours and workshops will be led by researchers at Imperial; the sessions during the day will allow teachers to learn some of the cutting-edge physics being undertaken at the university. A demonstration workshop will help teachers channel this cutting-edge physics research into their lesson plans, through specific demonstrations and examples that are directly linked to the national curriculum.
Details: contact Niloufar Wijetunge (e-mail niloufar@wijetunge.com).

East Midlands Teacher Network Day
Ockbrook School
1 October
This free event for anyone teaching or supporting physics will include lunch. David Wilkinson will present his lecture "The physics of not killing people – the search for less lethal weapons" and attendees will be able to choose from a number of workshops.
Details: contact Alison Gupta (e-mail alisongupta@rocketmail.com).

SPEED 2011 (Stimulating Physics East of England Day)
Netherhall School, Queen Ediths Way, Cambridge CB1 8NN
1 October, 10.00 a.m.
This will be a free day of hands-on physics activities for teachers run by specialist teachers from the SPN programme, with guest speaker Chris Lester from the University of Cambridge high-energy physics department.
Details: contact Jayne Foster, Science Learning Centre East of England (e-mail jayne@explorestem.co.uk).

10th Annual Welsh Physics Teachers Conference
Christ College, Brecon
5 October
This free event will feature a full day of activities that can directly benefit your work as a teacher of physics, including finding out about the changes in specifications/examinations, a choice of practical workshops and an exhibition. The lecture "CERN now and in the future" will be given by Dr Lyn Evans.
Details: contact Cerian Angharad (e-mail cerianangharad@gmail.com).

NQT Conference
Ramada Inn, Ealing
25–26 November
NQTs can take advantage of the Science Learning Centre London's NQT conference. There is a course fee of £200 but eligible teachers can claim an Impact Award of £200 to cover the cost.
Details and booking: visit www.slcs.ac.uk/network/11040.

Autumn Physics Update
University of Cambridge
16–18 December
This three-day residential course will feature a mixture of talks and hands-on workshops based at the Cavendish Laboratory and Churchill College.
Details and booking: visit www.iop.org/update or contact Manchi Chung (e-mail manchi.chung@iop.org).

Spring Physics Update
Royal Holloway, University of London
30 March – 1 April 2012
A three-day residential course featuring a mixture of talks and hands-on workshops based at the university's physics department.
Details and booking: visit www.iop.org/update or contact Manchi Chung (e-mail manchi.chung@iop.org).

A Day for Everyone Teaching Physics 2012
Durham University
21 June 2012
This will be a free event for anyone teaching physics, including a keynote lecture given by Prof. Julie Mennell, which will link physics to the latest developments in forensic science. Workshops will include David Featonby's "Toys" and Helen Pollard's "Another variety of experiments". There will also be an exhibition.
Details and booking: visit www.sciencelearningcentres.org.uk/centres/north-east.

Summer Physics Update
University of Birmingham
6–8 July 2012
This three-day residential course will feature a mixture of talks and workshops based at the university's physics department.
Details and booking: visit www.iop.org/update or contact Manchi Chung (e-mail manchi.chung@iop.org).

EVENTS FOR STUDENTS

IOP 2011 Schools and Colleges' Lecture – From X-rays to Antimatter: the Science of Seeing Inside Your Body
This free lecture for 14–16-year-olds, given by Dr Michael Wilson, continues its UK tour.
Details and booking: visit www.iop.org/schoolslecture or contact Clare Mills (e-mail clare.mills@iop.org).

Small Science, Big Ideas
3 October – Colyton Grammar School, Sidmouth
4 October – Okehampton College, Devon
5 October – Launceston College, Cornwall
6 October – Penair School, Truro
7 October – The Five Islands School, Isles of Scilly
This nanoscience/nanotechnology talk by Dr Annela Seddon will last an hour and is suitable for students aged 11–18.
Details and booking: contact Alison Rivett (e-mail alison.rivett@iop.org).

Olympics Physics Competition
15 November – University of Sussex
16 November – Royal Holloway, University of London
17 November – Queen Mary, University of London
18 November – University of Portsmouth
14 December – University of Southampton
9 February 2012 – University of Surrey
21 or 28 February 2012 – University of Kent
You are invited to bring a team of six year-12 students to a SEPnet partner campus to participate in a full-day challenge activity exploring the hidden physics in sport.
Details: contact Clare Harvey (e-mail clare.harvey@sepnet.ac.uk).

NPL calls for schools to submit films

The second National Physics Laboratory (NPL) Schools Science Film competition is under way. Schools, families or groups of friends are invited to make films, no longer than two-and-a-half minutes, describing or demonstrating an aspect of science correctly in an engaging way, using materials for which you have copyright permission.

The best 20 films will be showcased at a special awards event, with category prizes given to the best eight, and cash prizes to the best two (£500 for a school entry or £300 for an "independent" entry by a student). The submission deadline is mid-October.

NPL Management Ltd – Public

For more information: Details (including previous winners' films) can be found at www.npl.co.uk/schoolsciencefilm or e-mail schoolsciencefilm@npl.co.uk.

Science event returns to make a bigger bang

The Big Bang UK Young Scientists & Engineers Fair will be held at the NEC in Birmingham on 15–17 March 2012. Full of interactive exhibits, workshops and shows with plenty of audience participation, the Big Bang Fair is geared to show all young people how science and mathematics can take them from the classroom into an exciting career.

Your students will be amazed at what relies on science and engineering – from telephones, fashions and the car that they travel in – to space, surgery and much more. Whatever their interest, science and engineering is involved – it's going to be a real eye-opener. They will also find bucket-loads of inspiration from the 11–19-year-olds showcasing their projects at the event. These innovative students will "tell all" about the thrills of reaching the finals and having a stand among some of the biggest household names in science and engineering.

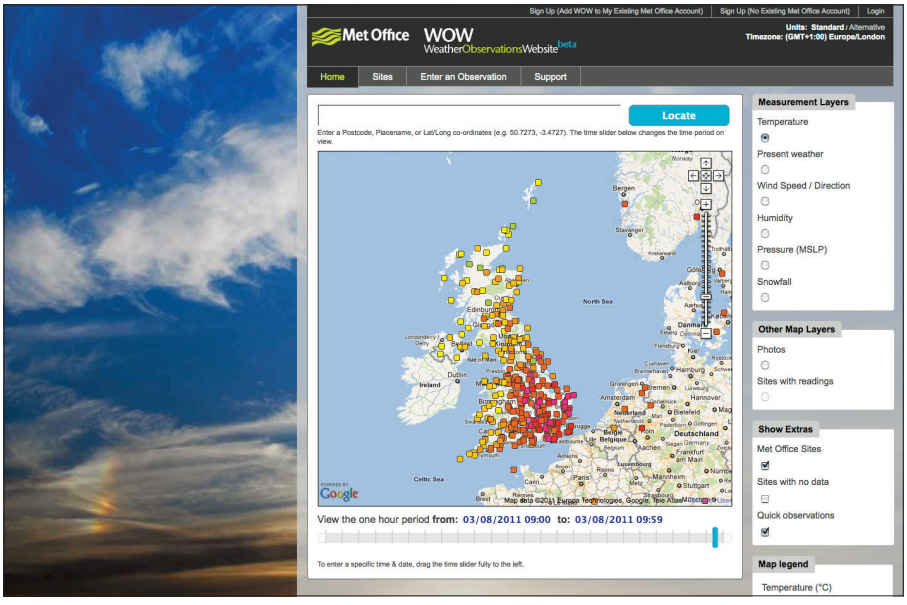
It's not too late for your students to enter the competition. If they have a great science, technology, engineering or mathematics project, they could win a place at the finals and ultimately be rewarded with a great cash prize. Entry is open until 31 October.

For more information: For updates, bookings and to enter students for the competitions, visit www.thebigbangfair.co.uk/nsec.

New weather website has the WOW factor

Any school that has an automatic weather station or makes weather observations of any other sort might be interested in the new *WeatherObservationsWebsite*^{beta} (*WOW*) site hosted by the Met Office at wow.metoffice.gov.uk/home.

The purpose of the website is to provide a platform for the sharing of current weather observations. This will be regardless of where they come from, what detail of information is provided or the frequency of reports. Met Office forecasters will also begin to use this data to add local detail to regional weather reports and forecasts.



Met Office

Right: a screenshot of the WOW *website.*

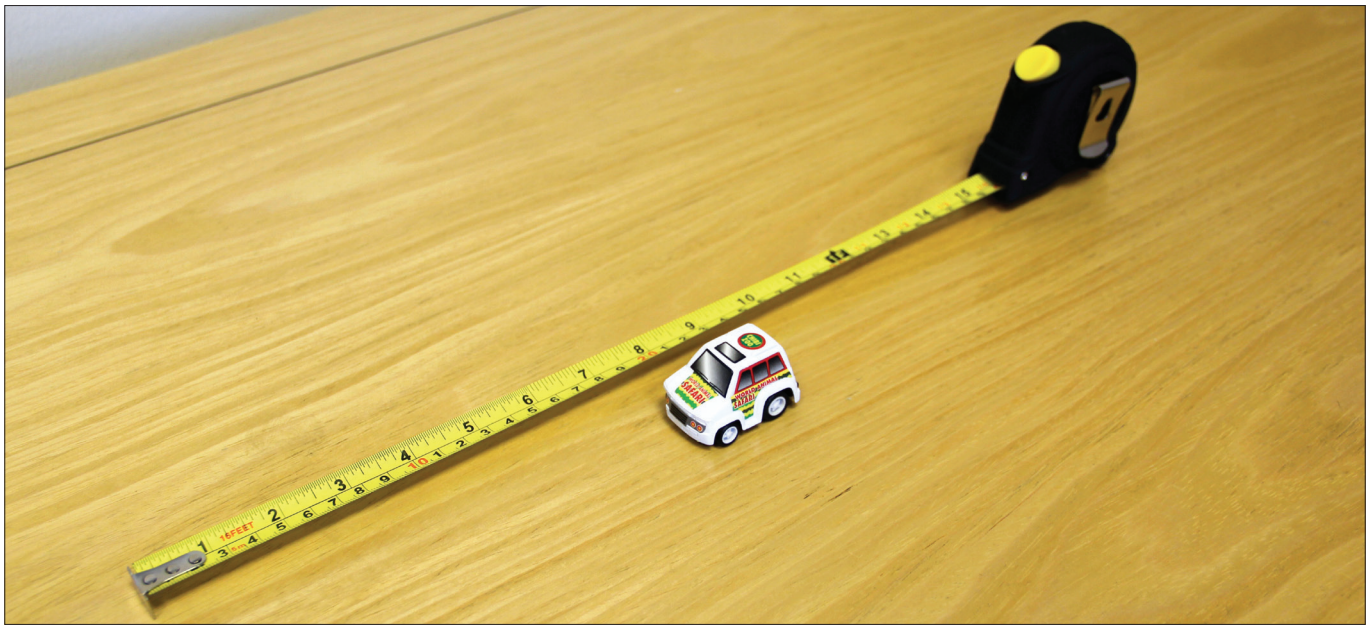
Get a headstart in 2012

Headstart has been established for more than 16 years as a charitable trust providing hands-on science, technology, engineering and mathematics (STEM) activities and engineering taster courses to encourage young people into technology-based careers.

In 2012 it will be providing science taster courses at five universities for students in Y12/S5. With subjects ranging from general/interdisciplinary science to a pure-physics course, there are a wide range of opportunities to explore what degree-level science is really like. For example, the University of Leicester is running a course to introduce students to its Natural Sciences Plus programmes, which offer a truly multidisciplinary approach by integrating various science strands in relevant, real-world contexts.

Applications will be accepted from 1 September and students should apply as soon as possible.

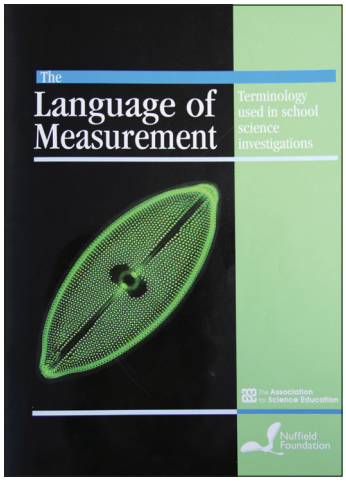
For more information: visit www.headstartcourses.org.uk or contact Kat Bridge (e-mail k.bridge@headstartcourses.org.uk).



Introducing the language of measurement

This activity was introduced to me by Peter Campbell and it is an excellent starter activity to get students to think about such terms as "accurate" and "precise" when engaged in practical explorations and investigations.

A source for definitions is the ASE–Nuffield publication, *The Language of Measurement*. It aims to enable teachers, publishers and awarding bodies to achieve a common understanding of important terms that arise from practical work in secondary science, consistent with the terminology used by professional scientists. The glossary of terms on pp8–13 is particularly useful. The booklet also includes some illustrative investigations, with an associated commentary.



Above: example of pull-back toy car and measuring tape. Inset: front-cover of the ASE–Nuffield publication, The Language of Measurement.

Activity: "How far does a pull-back toy car go?"

Apparatus per group:

- a pull-back toy car
- a measuring tape/rule – either of the following:
  - a metre rule
  - a steel retractable measuring tape
  - a paper tape marked (such as you can get in IKEA)
  - a dress-making tape

Teaching notes:

- Ask your students to find out if there is a relationship between the distance that the car is pulled back and the distance it travels after release.
- It is probably best to have groups of three or four.
- It quickly becomes clear that the distance the car travels is affected by a number of other things, apart from the distance that it is pulled back. This should promote discussion in the group about how to take some useful measurements.
- Stop the activity after about five minutes and get feedback from the groups.
- Students will find that they need to consider the uncertainty in their results as well as precision and repeatability. They might want to consider what number of significant figures is appropriate in recording their results.
- Allow them to have more time to take measurements and plot a graph.
- Because the car's motion is relatively unpredictable, this allows plenty of room to think carefully about what might be an appropriate number and range of measurements for this task.
- Students may assume that the distance that the car travels after release is proportional to the pull-back distance and it is useful to discuss whether their results support this assumption or not.

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With thanks to **Peter Campbell**, who introduced this idea to me.