


# CLEAPSS BULLETIN

## The Art of Practical Science

20–22 July 2009, CLEAPSS Laboratory, Brunel University Science Park

### All Heads of Science

Do you have or are you about to appoint newly qualified or recently qualified teachers or those teaching outside their subject specialism? This three-day course combines hands-on tuition and practice across the three sciences with activities designed to help your teaching at KS3, GCSE and/or post-16 including: • microbiology – aseptic technique and dissection; • radioactivity and handling radioactive sources; • physics practicals and demonstrations; • microchemistry and chemistry demonstrations; • analytical techniques and gas reactions; and • health & safety – a 'practical' update.

The course costs £380, which includes accommodation on campus for the Monday and Tuesday nights, and all meals and refreshments.

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Tel: 01895 251496

### The patter of smaller feet than usual?

Among the varied activities crammed into the summer term in many secondary schools may be some type of primary liaison. Year 6 – or even younger – children might visit and spend perhaps an hour in the science department. This is an excellent opportunity to introduce potential students to the wonders of Big School science; however, it is not an ideal time to showcase

all the most exciting highlights of Year 7 work. Even if time permitted, what would be left to wow them when they join school themselves? Remember that many primary children may also be smaller than your students. Can they reach the benches? Choose lower-risk activities that don't need eye protection - this spares the need to source small safety spectacles and to ensure visitors use them properly. There are plenty of exciting activities

## Latex allergy

A school contacted us recently to report a mild allergic reaction in two separate students triggered by using balloons in a science lesson. The trigger was thought to be the latex in the balloons. This is the first report of its kind to have reached CLEAPSS so we would be grateful to know if other science departments have had similar experiences. We would like to be able to gauge the extent of this sort of allergy and will report back in a future edition of *Bulletin*.

that can be used to intrigue your young visitors in the short time they might spend in your unfamiliar laboratory. You could offer a simple task using an unfamiliar material such as 'magic' sand or snow or invite children to view their own hair under your digital microscope. For guidance on the points to think about and places to find more ideas, see **PS71** *Primary/secondary liaison in science*.

## FREE

to all member  
secondary schools  
& other members.

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# Improving practical work in science

**This is a two-year project funded by the Department for Children, Schools & Families (DCSF) and managed by the ASE and CLEAPSS. The project is supported by the National Science Learning Centre and Network of Science Learning Centres, the Centre for Science Education – Sheffield Hallam University, the Specialist Schools and Academies Trust, the Institute of Education and the Royal Society. The Royal Society of Chemistry, the Institutes of Biology and Physics, the Science Enhancement Programme and other national organisations interested in practical work in school science are also providing support and taking on board the project messages.**

The project is intended to reach all science teachers and those interested in science education. This means that you will probably read about this project in materials from those organisations involved in the project, including journals, education and other newspapers, and magazines. It will also be mentioned in a great deal of science CPD.

At the heart of the project is a relatively simple message. It's not about doing more practical work, although some teachers may wish to do more, it is about teachers

knowing clearly the purpose for each practical activity, and making this purpose clear to their students. In this way, once the activity is over, both teachers and students can check to see if the purpose has been achieved and if the students are ready to move on to the next part of their science learning.

The project will involve some specific CPD for teachers and aims to train around 200 experienced science teachers who will then go on to train others. The audiences for the training will include both primary and secondary teachers, teaching assistants and HLTAs, and secondary science technicians. To help get the message across there will be presentations to science teacher organisations, to head teachers and to others that may be able to promote the project messages and aims.

The project draws on several SCORE (Science Community Representing Education) documents, two of which are being distributed to every school in the country, including:

- *Getting practical – a framework for practical work in science*
- *Explore, inspire, discover – practical work in science*
- *Explore, inspire, discover – practical work in primary science*

There is also a report commissioned by SCORE, which looks into how practical work is valued and used. A copy of the report is available at [www.score-education.org/2projects/practical\\_work.htm](http://www.score-education.org/2projects/practical_work.htm)

The project starts in April 2009 and will formally end in April 2011. We hope that the majority of science teachers will be exposed to the project and at least some of the means of making its aim a reality in the classroom. We hope that these teachers will assimilate the methods and intentions into every science lesson so that the project lives on and prospers. When surveyed recently science teachers reported that they enjoy practical work and think it is essential to science education. The project is about improving practical work by teachers using and tailoring practical activities and how they are managed to meet a particular purpose.

CLEAPSS whole-heartedly supports this project and we worked with the ASE to bid for the contract to implement it. You will be hearing more about it from us over the next two years. Watch this space.

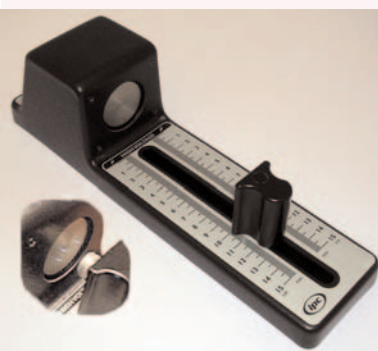
## Woosh bottles

Thanks to the technician who tipped us Water Enterprises [www.express-bottles.com](http://www.express-bottles.com) cooler bottles suitable for the 'woosh' b reasonable price (around £3.50/bottle very efficient.

## Sparks of interest

**A spark counter is a 'must have' piece of equipment for investigating ionising radiation, enabling us to observe the effect of a single sub-atomic alpha particle.**

Most spark counters use a stretched wire that produce sparks in one dimension, however, IPC has now developed a two-dimensional spark



counter with a 4 cm diameter window and a vertical array of 17 wires. A standard cup-type alpha-emitting radioactive source and a school 5 kV EHT power supply are also needed to make it work, and rapid sparks can be counted by connecting a scaler (digital counter). The IPC spark counter is available for around £175 from:

Scientific and Chemical Supplies Limited  
[www.scichem.com](http://www.scichem.com)

(product no. XAR 210010);

Timstar [www.timstar.co.uk](http://www.timstar.co.uk)  
(product no. RA 95605).

off about a company in Wales – Cool  
[www.cool.com](http://www.cool.com) – that supplies the large water  
bottle demonstration at a very  
plus postage). We found their service

## Keep tapping the mercury

Reports claim that clinical mercury thermometers and barometers will soon no longer be available. The Department for Environment, Food and Rural Affairs (DEFRA) has confirmed that there are no current restrictions on selling mercury to schools or using it in school science. A review into selling mercury measuring instruments for use by the general public is in progress. Because of its hazards and detrimental effect on the environment there is also a general move to reduce using mercury and to find alternatives. However, at the

moment we don't know how this will affect its future availability. So you can certainly still use mercury, mercury metal and other instruments containing it. For some applications there is no suitable alternative; where one exists it may be prudent to use it.

There is more information on handling mercury in the *Laboratory handbook* section 12.13. See section 7 for guidance on storing and disposing of mercury, particularly details for clearing up mercury spills (section 7.7).

We will keep an eye on the progress of the review and let schools know if it leads to any changes.

## Rare earth magnets

**Many science investigations use magnets. Traditional steel or ferrite ceramic (motor) magnets should be used whenever possible and are okay for most purposes.**



Where extremely high magnetic fields are required, small magnets made from rare earth elements can be used. These are made from sintered, compressed powders, which often contain neodymium, iron and boron. The powders are usually encased in a thin layer of shiny nickel. Some types are encased in plastic or rubber, to provide additional protection.

Only responsible students should be allowed to use these magnets, or it may be best for teachers only to use rare earth

magnets. Students must be given careful instructions on how to use the magnets safely and be well supervised.

The following precautions must be taken whenever these magnets are used.

- Count the number of magnets given out and count them back in.
- Keep magnets well away from bank cards, identity cards, computers and other electronic equipment.
- Keep magnets well away from people fitted with pacemakers.
- Avoid situations where two magnets can jump together suddenly and cause a pinch injury.
- If a magnet is dropped, or two magnets collide, the shattered parts can cause cuts or eye injuries.
- Wear eye protection if shattering is a possibility.
- If a rare earth magnet is swallowed, seek medical attention immediately.

## New publications

### G14 Designing and planning laboratories

Updated advice and help for those planning and designing school laboratories whether it's a new science suite or a refurbishment of an individual lab or prep room, including the common pitfalls and good design principles to follow for a successful layout and build and.

### G206 Tadpoles

Now is a good time to collect spawn and watch it develop. This guide gives information on how to collect spawn and keep tadpoles in the classroom, and ideas for scientific investigations.

### SRA 16 The alcohol 'gun'

We have produced a supplementary risk assessment for this exciting demonstration. An alcohol and air mixture in a plastic pop bottle is ignited and then explodes, which fires the cork across a room.

### PS 72 Plaster of Paris

We have updated our guidance on the safe use of plaster of Paris with the results of our investigations into the temperature rise that happens as it sets. Serious burns can happen at relatively low temperatures! Do not encase body parts in plaster of Paris to make a mould!

### R142 Equipment and materials for environmental monitoring

This guide gives information about environmental monitoring and datalogging. There is general

guidance about selecting the appropriate equipment and reviews of many of the dataloggers currently on the market.

### Model risk assessments for design & technology

We have been working on updating our *Model risk assessments for design & technology*. We hope to have it completed soon and to include it in a new D&T resource on our web site. Keep an eye on our web site for developments! Please inform your colleagues in the D&T, food technology and textiles departments.

### Laboratory handbook section 7, chemicals

We have updated the advice in section 7 of the *Laboratory handbook*. We have also restructured it to make the advice clearer and easier to use. We expect it to be ready by the start of the summer term and it will be available on our web site soon after.

## Publications for sale

### CLEAPSS 2009 Science Publications

**CD-ROM** £8.50 [Expires Jan 31, 2010]

### Hazards – 2007 edition

One set issued free;

£10.00 per set (1-4 sets)

£ 9.50 per set (5-9 sets)

£ 9.00 per set (10+ sets)

### Recipe Cards

(2007 update of 1999 edition)

£5.00 per set

### Student Safety Sheets (2007 edition)

£3.50 per set

### CLEAPSS Laboratory Handbook

£34.00 (2 binders + all pages)

£25.00 per set (pages only)

£4.50 (binder)

£1.50 (per chapter)

£5.00 (2007 updated pages)

**Guides** (L- and R- series) £1.00 each

**Guidance Leaflets** (PS- series) £0.25 each

**CLEAPSS D&T Publications CD-ROM** £11.00

### Model Risk Assessments for Design & Technology

**Part 1** For work with resistant materials £5.00.

**Parts 2 & 3** For work with compliant materials & with foods £5.00 (not available separately)

**Parts 1, 2 and 3** combined £9.00

**Hazardous Chemicals CD4 (SSERC):** For A-level work. CLEAPSS members and associates can buy this CD-ROM at the reduced price of £40.00 (or £20.00 if hard-copy or CD 1/2 already purchased). Contact CLEAPSS for details.

Handling charge, per order £1.50

Minimum order charge (cheque with order) £2.50

Minimum order charge (by invoice) £5.00

(Postage included except for orders from overseas; contact us for charges)

## CLEAPSS Courses

Course	April	May	June	July	September	October
Basic Chemical & General Skills	London (SLC)	Norfolk (SLC)			London (SLC)	
Basic Physics Skills	London (SLC)		Essex (SLC)	Bradford		
Making Simple Science Equipment	Swindon (SLC)		Kent; Southampton (SLC)	London (SLC)		
Microscope Maintenance	London (SLC)		Oldham; East Midlands (SLC)			Southampton (SLC); Oxfordshire (SLC)
Running a Prep Room	Bristol (SLC)					Southampton (SLC)
Working with Glass	Solihull	London (SLC)	Gloucestershire	Pontefract	Cornwall	
Chemical Safety for Technicians	Guernsey	London (SLC); Northern Ireland; West Sussex	Durham (SLC)	Buckinghamshire		London (SLC)
Practical Skills & Techniques in Chemistry	Guernsey; Bristol (SLC)	East Midlands (SLC); Salford; London (SLC)	Dartford; East Midlands (SLC)	Kirklees	Northern Ireland	Northern Ireland; London (SLC)
Fume Cupboard Monitoring			CLEAPSS			
Biology Safety	Southampton (SLC)	Dartford				
Microbiology	Dartford	Southampton (SLC)	Bristol (SLC); Birmingham; Keele (SLC)		Blackpool; London (SLC)	Essex
Physics Training for Technicians		Gloucestershire	Scarborough	Dartford; East Sussex; Hillingdon	London (SLC)	
Electrical Inspection & Testing		Southampton (SLC)	London (SLC)			
*Radiation Protection Supervisors	Sheffield (SLC)	Gloucestershire; Nottingham; Keele (SLC); Leicester	Wiltshire; Norwich; London (SLC)		Kirklees; Isle of Man	Durham (SLC)
Health and Safety for Technicians	Suffolk; Wiltshire; Durham (SLC)	Bristol (SLC); London (SLC)	Kent; Essex; Staffordshire; Shefford Bedfordshire (SLC)		Hertfordshire; Gloucestershire	London (SLC); Norfolk
*Health and Safety Management			Eastbourne;	Shropshire		Norfolk
*Health and Safety in Practical Science				Essex	Barking	
*Safe and Exciting Classroom Chemistry	East Midlands (SLC)	Keele (SLC)	Sheffield (SLC); Cambridge (SLC)	Durham (SLC)		
*Surely it's banned/Microscale Chemistry						
The D&T Technician		London				
D&T Workshop Maintenance						
*H and S Management in D&T		Norwich				
*Art of Practical Science				CLEAPSS		

\* Denotes courses primarily for teachers