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### Welcome to the new school year

With the summer holidays gone and all too quickly becoming forgotten, its time to look forward to the new academic year. There have been several new developments here at CLEAPSS.

- A new-look website, which we hope will make looking for information and material even easier. We plan to switch over within a few weeks of the start of term.
- Model risk assessments for Art and Design. These are almost ready and will be uploaded shortly onto the D&T resources part of our website. They have been thoroughly researched and should be useful to all teachers and technicians working in this curriculum area.
- The number of new Academies looks set to increase significantly with the specific intention of being outside local authority control. This may mean that local authorities will no longer pay the CLEAPSS subscription. If your school is becoming an academy make sure that it joins CLEAPSS as an individual (associate) member. Visit our website for details or call us on 01895 251496.
- In July the CLEAPSS governing body agreed to allow individual school science and technology advisers to become members. If you are working as an independent adviser having access to CLEAPSS advice and resources will be useful. Visit our website for details or call us on 01895 251496.
- For those of you in Wales we have produced a Welsh-language version of this *Bulletin*, which you can download from our website. Next month there will also be a Welsh-language version of our primary newsletter *Primary Science and Technology*.

#### Hazard reclassification of borax

Have you noticed how difficult it is to find borax (disodium tetraborate decahydrate) in the shops for making slime? Although you might come across old stock in shops, you will probably now have to buy it from educational suppliers. Surprisingly it comes with a TOXIC symbol because it carries the R60/61 warning – may cause infertility and may cause harm to the unborn child. The latest information from the European Chemical Substances Information System is that it is a class 2 teratogen. The classification of this substance and other boron compounds is controversial and has caused much debate in Europe over the past few years. The compromise



decision is that the solid and solutions in excess of 8.5% should be labelled TOXIC, but other solutions will not carry any hazard warning. The normal slime recipe is a 3.2% solution so it does not need a hazard label.

This sort of information can be worrying. The following quotation is abbreviated from the Sigma-Aldrich Safety Data Sheet for borax:

*Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes... The doses administered were many times in excess of those to which humans would normally be exposed... A recent epidemiological study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility.*

CLEAPSS will alter *Hazard* 14 and other information on boron compounds in due course. It is worthwhile weighing the material very carefully, possibly in a fume cupboard which is not switched on. Pregnant women should avoid handling the solid. You may like to copy this article and attach it to *Hazard* 14.

#### New buildings, refurbishments and CLEAPSS advice

At our recent conference for science advisers and H&S officers, a (science-trained) assistant head teacher talked enthusiastically about planning, designing and overseeing the creation of a science building. It involved hours of commitment on her part plus the cooperation of the architect and (local) building contractors. The assistant head also consulted several publications during the process including from government – *eg Building Bulletin 80 and CLEAPSS – eg G14 Designing and planning laboratories*.

However, we also hear of new builds, for example where chemistry stores are up a separate flight of steps or consist of a couple of cupboards. We hear of the loss of technician working space and fewer than the recommended number of science laboratories. On more than one occasion designers and builders have stated that CLEAPSS advice is not a legal requirement, but only a recommendation. While this is true, our advice is based on years of experience, and on information from the government, the Health and Safety Executive (HSE) and from our members. It is nationally and 'officially' recognised as good practice, which prevents educational mistakes and accidents. We know our advice carries weight because we were recently involved in a court case where our advice was both sought and accepted as evidence. We believe our advice is sensible and balanced and we have worked positively with many companies building or rebuilding science facilities. We hope this will continue and that we do not find ourselves in the future dealing with preventable accidents – *eg technicians falling downstairs carrying chemicals or spilling chemicals due to a lack of working space – brought about by disregarding our advice.*

### FREE

to all member  
secondary schools  
& other members.

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# Bash them over the head with COSHH

A number of science departments have contacted our *Helpline* because they have been asked to fill in COSHH forms, sometimes running to several pages each, for the chemicals they store. Whatever the intention these COSHH forms are described or referred to as risk assessments. Our observations are outlined below.

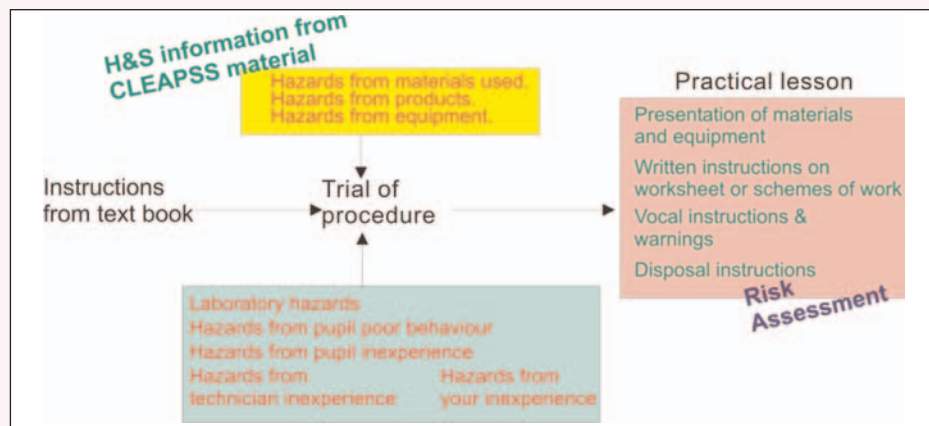
- Regulations, not just COSHH, made under the Health & Safety at Work Act require employers to carry out risk assessments on hazardous activities and situations. Employees can only undertake risk assessments on behalf of their employer when they have sufficient expertise (by experience or training), and the time to do the task.
- The term 'COSHH form' is being used where what is being sought is an appropriate chemicals stock list. CLEAPSS' approach to risk assessment is described briefly in our guidance leaflet PS 90 *Making and recording risk assessments in school science*, and in our guide L196 *Managing risk*

*assessment in science*. We prefer to avoid forms of any sort preferring relevant risk assessment information to be recorded at the point of use – on schemes of work, technician cards, student worksheets *etc*. This is in line with the HSE's approach (see guide L196 and also *Risk assessment must always be long and complex* [www.hse.gov.uk/myth/may.pdf](http://www.hse.gov.uk/myth/may.pdf)).

Departments storing and handling chemicals according to CLEAPSS advice and maintaining a stock list such as a customised version of the electronic document E233 *Chemical stock list* should meet the needs of any COSHH requirements, and keep the paperwork to a minimum. In addition, in case of fire, fire services need to know where the HIGHLY FLAMMABLE and EXTREMELY FLAMMABLE chemicals, radioactive sources and any gas cylinders are kept. The radioactive sources could be included on the chemical stock list and a copy given to the school office in case of emergencies. Employers that have bought into CLEAPSS services generally expect CLEAPSS guidance to be followed in their schools.

## Risk assessments in new publications

Are you starting a new course or syllabus this year? New publications often contain practical activities that you may not have come across. Texts may contain information about the materials and equipment, but this is not a risk assessment. Model risk assessments, and information material and equipment, are provided by your employer (the local authority or governors *etc*) by virtue of CLEAPSS membership (see yellow box). In schools you have to consult model risk assessments and apply them to your specific situation, where there will be factors known only to you (see blue box). The combined risk assessment information can be integrated into any written instructions (for teachers, technicians and/or students) for practical lessons (see pink box). This becomes the recorded risk assessment. See guidance leaflet PS90.



## Laboratory taps (again)

The WRAS (Water Regulations Advisory Scheme) has recently circulated further comments on laboratory taps in its newsletter. Clearly the issue of the potential for backflow into these taps continues to cause concern (see *Bulletin137* and section 6.2 of G14 *Designing and planning laboratories*). The concerns hinge around hoses attached to laboratory taps (any laboratory, not just in schools) in which the flow can be constricted, or in some other way compromise backflow prevention. Water companies are advised to 'require alternative means of backflow prevention at the point of use in premises', where concerns are identified.

If the taps in your labs are fed from a header tank or you have a new lab with compliant backflow prevention installed then these concerns will not affect you. For schools without backflow prevention to current regulations, CLEAPSS advice is:

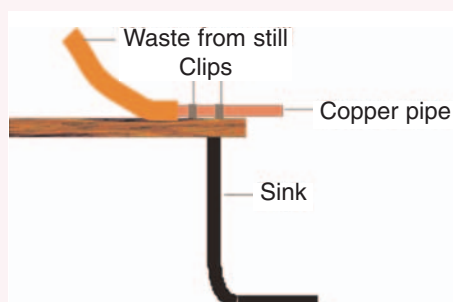
- remove hoses from all laboratory taps and attach them only when required. This includes eye wash hoses. Put these in a plastic bag pinned to the wall near the designated sink, and label them for use in emergencies only;
- have no devices, such as water-driven filter pumps permanently attached to a laboratory tap; and
- if you have a still connected to a laboratory tap, fix the outlet pipe in such a way that it

## A hydrogen peroxide incident

CLEAPSS has often warned about the safety of experiments from various Internet sources. For example, there is one that uses red lead oxide to catalyse the decomposition of 100 vol hydrogen peroxide. The reaction is so rapid and exothermic that a plume of water vapour comes from the neck of the conical flask (often called the genie). Our chemists at CLEAPSS tried this several years ago and discovered that hydrogen peroxide aerosols and lead oxide particles were present in the water vapour – not pleasant to breathe in.

In a recent incident a teacher filled a two-litre conical flask with 100 vol hydrogen peroxide to a depth of 2 cm and then added the red lead. Nothing happened. (The only explanation at the moment is that the catalyst was not 'wetted' sufficiently.) The teacher returned to the conical flask and added another 2 cm depth of 100 vol peroxide. The flask immediately exploded causing a serious cut. We calculated the gas pressure inside the flask approached 20 atm. It was the unnecessarily large scale of the reaction that was the main issue and possibly stress in the large conical flask that was used for this reaction also contributing. We have produced a *Supplementary Risk Assessment (SRA 17)* for this demonstration, which is available on our website.

cannot dangle into the sink. A short length of copper, or similar, pipe can be fixed to the worktop, using pipe clips, so that its end overhangs the sink. The outlet from the still can be connected to this pipe so that there is never any risk of backflow through the still.



# Getting Practical

## (Improving Practical Work in Science Programme)



### Calling all teachers of science!

*Are you ready to look at your teaching with fresh eyes?*

*Do you wish you could do something more with the tired activities that clog your schemes of work?*

Then **Getting Practical** is the course for you!

This free, local CPD course could transform the effectiveness of your classroom practice and help improve your learners' experience of practical science. It shows you how to plan, practise and stage your practical activities to produce learning outcomes with impact.

Networking and discussing best practice is an important part of any teacher's professional development. Getting Practical is a reflective course, exploring the pedagogy behind practical science teaching, linking 'hands-on' with 'minds-on'.

*Getting Practical – Improving Practical Work in Science Programme* is funded by DCSF with coordinating partners ASE, CLEAPSS, national network of SLCs, CSE at Sheffield Hallam University and contributing partners the SSAT, IOP, Society of Biology, RSC, Gatsby SEP, National STEM Centre and the University of York with support from SCORE, the Royal Society, Gatsby SAPS, the National Strategies, LSIS, the Wellcome Trust, the Nuffield Foundation and the YSC at the RI. The independent evaluators are the IOE at the University of London.

Participants are introduced to new ways of evaluating their own teaching and receive advice on using the 'review tool' to manage the preparation and analysis of practical science sessions.

**Don't look away,  
look again.  
Look deeper.**

For more information, visit [www.gettingpractical.org.uk](http://www.gettingpractical.org.uk) to find out where and when courses are taking place across England. New dates are constantly being added so check regularly.

*Getting Practical* is also supporting the Royal Society of Chemistry (RSC) *LabSkills* project. *LabSkills* is an interactive e-learning tool that enables chemistry teachers and students to do pre-work ahead of chemistry classes, to maximise the quality of the time they spend in the laboratory. A USB stick of these resources is available free to all UK state secondary schools and FE colleges. To register your school to receive the resources, visit [www.discoverlabskills.org](http://www.discoverlabskills.org)

### Gas installations in educational establishments (the 2nd edition of IGE/UP/11)

The Institution of Gas Engineers and Managers (IGEM) has published a new edition (IGE/UP/11) of the above publication for educational establishments.

The new draft is different to its predecessor and now contains guidance sections for school personnel – governors, bursars, head teachers, teachers, technical staff *etc* – detailing their duties and responsibilities with respect to all gas installation and appliances. It is hoped that this advice will be an essential part of the training for those in educational establishments working with gas appliances. The educational part of the document is available to buy from [www.igem.org.uk/technical/standards.asp?mci=10](http://www.igem.org.uk/technical/standards.asp?mci=10) (reference number IGE/UP/1101)

The contents of the main publication are intended for competency training for registered gas personnel and it is also essential for those designing and specifying equipment to ensure the safety of students, staff and visitors.

### Technician tip: storage help

Tall measuring cylinders and burettes are difficult to store safely. These storage ideas were sent in by a technician and may help to avoid breakages.



*Measuring cylinders tucked away safely in a tray.*



*The strong cardboard cylinders in which burettes are delivered can be secured in a quiet corner and used as a burette store. Try to stock up with 25 cm<sup>3</sup> burettes, which are more easily filled than standard 50 cm<sup>3</sup> versions.*

### Technician tip 2

Are you aware of the *Waste Batteries and Accumulators Regulations*, [www.opsi.gov.uk/si/si2009/uksi\\_20090890\\_en\\_1](http://www.opsi.gov.uk/si/si2009/uksi_20090890_en_1) ? The net effect is that any shop selling more than 32 kg of batteries per year must provide free take-back facilities – and you don't have to buy new batteries.

## Good ideas for practical work

Rather than 'Google' for practical ideas why not try: [www.practicalbiology.org](http://www.practicalbiology.org) [www.practicalchemistry.org](http://www.practicalchemistry.org) [www.practicalphysics.org](http://www.practicalphysics.org) All of the activities on these sites have been produced by experts and checked by CLEAPSS for health and safety. Teachers using them can be confident that the activities work and are safe.

## Using chemicals with primary pupils

The CLEAPSS primary guide on using chemicals has recently been revised and published as G5p *Using chemicals safely*. It can be used to help schools that invite younger children in or liaise with primary schools in other ways. You can find a copy on our website in the *Secondary resources*. Note that this is a primary guide and for secondary activities continue to use secondary resources such as *Hazcards*.

There has been an 'explosion' of calls to our *Helpline* from teachers eager to blow things up – eg hydrogen, methane – for Year 6 or even Year 5 or 4 students on taster days in secondary science. You may find better ideas in this guide but also check with your primary colleagues that they are not already using or planning the activities you'd like to use.



## A cluster of CLEAPSS courses for technicians (and/or teachers)

Particularly with overseas members in mind, we are again offering four one-day courses over consecutive days in January. The courses are mainly for technicians (some are also useful for teachers) and will be held at our premises in Uxbridge (near Heathrow Airport, London).

### The courses are:

Basic Microbiology *Tuesday 25th January 2011*

Physics Training for Science Technicians *Wednesday 26th January 2011*

Chemical Safety for Technicians *Thursday 27th January 2011*

Morning: Choice of follow-up Microbiology for those who attended day 1 or Principles of Health and Safety/Running a Prep Room

Afternoon: Glass working *Friday 28th January 2011*

Individuals can enrol for single, multiple or all four courses.

One course £80 Three courses £220

Two courses £150 Four courses £290

The costs do not include evening meals and accommodation. High quality, relatively inexpensive accommodation can be booked on the Brunel University campus. Contact us for more details **01895 251496**.

## CLEAPSS Courses

| Course  | September                     | October                         | November  | December                                   | January                             | February                                |
|---|-------------------------------|---------------------------------|---|--|-------------------------------------|---|
| Basic Chemical & General Skills   |                               | Essex;<br>London (SLC)          | Bristol (SLC)                                   |  | Southampton (SLC)                   | Leicester (SLC)                         |
| Basic Physics Skills  |                               |                                 | London (SLC)                                    | Durham (SLC);<br>Melton Mowbray            | Southampton (SLC)                   | Bristol (SLC)                           |
| Making Simple Science Equipment   |                               |                                 |   |  |                                     |   |
| Microscope Maintenance  | London (SLC)                  | Bristol (SLC);<br>Herefordshire | Lincoln (SLC);<br>Chertsey                      | Wirral                                     |                                     |   |
| Providing and Managing Effective Technician Support<br>(formerly Running a Prep Room) |                               |                                 | Brighton (SLC);<br>Greater Manchester           | Bristol (SLC)                              |                                     |   |
| Working with Glass  |                               | Cumbria;<br>Bedfordshire        |   | Buckinghamshire                            |                                     |   |
| Chemical Safety for Technicians   | London (SLC)                  |                                 | Gloucestershire                                 |  | London (SLC)                        | Keele (SLC)                             |
| Practical Skills & Techniques in Chemistry  | Powys                         | Greater Manchester              | Brayfordbury(SLC);<br>London (SLC)              |  | London (SLC)                        |   |
| Fume Cupboard Monitoring  | Wolverhampton                 |                                 |   | Uxbridge (CLEAPSS)                         |                                     |   |
| Reduced and Microscale Chemistry  | Wolverhampton                 |                                 |   |  |                                     | Essex                                   |
| Biology Safety  |                               |                                 |   |  |                                     |   |
| Basic Microbiology (New)  |                               | Lincoln (SLC)                   | Bristol (SLC)                                   | London (SLC)                               | Buckinghamshire                     | Essex                                   |
| Further Microbiology (New)  |                               |                                 | Plymouth  | London (SLC)                               |                                     | Bristol (SLC)                           |
| Physics Training for Technicians  | London (SLC)                  |                                 |   | Oxfordshire                                |                                     |   |
| Electrical Inspection & Testing   | Wakefield                     | Herefordshire                   | Eastbourne                                      |  |                                     | Herefordshire;<br>Kent                  |
| *Radiation Protection Supervisors   | London (SLC)                  | Salford; Norwich;<br>Cambridge  | Pembrokeshire;<br>Devon                         | Oxfordshire; Essex;<br>Windsor & Maidehead | Wirral; Bolton;<br>Nottingham (SLC) | Bristol (SLC); Kent;<br>Buckinghamshire |
| Radiation Protection Officer  |                               | Salford; Uxbridge               |   |  |                                     |   |
| Health and Safety for Technicians   | Ipswich;<br>London (SLC)      | Dartford; Liverpool             | Norwich; Essex;<br>Barnet;<br>Southampton (SLC) |  | London (SLC)                        |   |
| *Health and Safety Management   |                               |                                 | Essex; Norwich                                  |  |                                     |   |
| *Health and Safety in Practical Science   | Barking &<br>Dagenham; Barnet |                                 | Leicester (SLC)                                 |  |                                     |   |
| *Safe and Exciting Classroom Chemistry  |                               |                                 |   |  |                                     |   |
| *Surely it's banned/Microscale Chemistry  |                               |                                 |   |  |                                     |   |
| The D&T Technician  |                               |                                 |   |  |                                     |   |
| D&T Workshop Maintenance  | Powys                         | Newcastle on Tyne               |   |  |                                     |   |
| *H & S Management in D&T  |                               |                                 |   |  |                                     |   |
| Risk Assessment and Safety Update   |                               | Hampshire (VI college)          | Powys   |  |                                     |   |

\* Denotes courses primarily for teachers.