



SCHOOL SCIENCE SERVICE

Circulation list			

Serious accident involving new teacher

We have heard about an accident in which a young teacher, a recent arrival from South Africa, was seriously injured. We can give only a brief summary here but, in essence, he was demonstrating the reactions of various mixtures of potassium chlorate(V) and other substances. After several successful demonstrations, a mixture of potassium chlorate, magnesium and sulfur spontaneously exploded, severely injuring the teacher's hands. Skin grafts were needed and he was off work for over two months. Staff at the school appeared to be surprised that the mixture could explode spontaneously, although *Hazard 77* specifically warns about this danger. A technician attempted to draw attention to the guidance on the *Hazard* but its significance was lost on the teacher, if he even read it. There was little supervision of this inexperienced teacher and there had been no risk assessment for an activity that was not part of the school's normal science curriculum.

There are several important lessons for other schools to learn. There must be proper induction for all new teachers and technicians which should include raising awareness about the departmental health & safety policy. For those not trained in the UK, the induction needs to be much more thorough and should be properly documented; see our leaflet PS38, *The Training of Science Staff, etc.* It is important that new staff are introduced to standard safety publications and made aware of the need to follow the guidance therein. They need training in risk assessment and hands-on training in some techniques, especially if their experience of practical work is limited, as is often the case with those trained overseas. Lessons need to be closely monitored and there must be a ban on activities outside the normal scheme of work, unless a thorough risk assessment has been carried out. Under the *Management of Health & Safety at Work Regulations*, induction training for new staff is the responsibility of the employer. For some overseas-trained teachers, the employer may well be an agency, some of which are probably failing to meet this legal obligation. CLEAPSS is of the opinion that there needs to be a properly-funded, national scheme of induction for overseas-trained teachers, with a major emphasis on hands-on training in the teaching of practical science. Even if this were available, however, schools would still need to provide some local induction into school policies and practices and their ways of working.

Exploding spirit burners

Explosions have occurred when using spirit burners during investigations on fuels. We were able to reproduce a small explosion with methanol, by using a wick in the burner that was much narrower than the hole in which it fits, thereby creating a gap between the wick and the holder. If the spirit burner is only partially filled with methanol, there is an air/methanol mixture in the vessel. As methanol rises up the wick and is ignited, the flame can backfire through the gap into the vessel, causing a small explosion. Therefore, when replacement wicks are bought, they must have an appropriate diameter and fit snugly in place. We would also suggest that the spirit burners are completely filled with the fuel being studied. (See also the technician tip in *Bulletin 89*.)

Bottled water in science lessons

In *Bulletin 115*, we discussed pupils carrying bottled water around with them and being encouraged to drink whenever they wanted. We questioned the evidence on which this was based. We have now seen strong scientific evidence that even mild dehydration can result in a significant deterioration in mental performance and other medical effects. Given the appalling state of drinking fountains in most schools (if any are provided), it is very likely that a proportion of pupils are dehydrated at school.

More information can be found on the *Water is Cool in School* campaign web site: www.wateriscoolinschool.org.uk. The Information Pack for this campaign (page 12) indicates that bottles should be barred from science labs, a view which we endorse.

Electronic publications

We hope that everyone has by now received the CLEAPSS *Science Publications CD-ROM* and that you are finding it invaluable. If you have not yet received the CD-ROM, please contact our **Helpline** and we will tell you the person that the CD-ROM for your school or college was sent to. If technicians do not have access to a computer in the prep room that can read the files on the CD-ROM, we suggest that bids are made as soon as possible for a suitable machine (not a cast off from the IT department!), preferably with an Internet connection. If you are having trouble encouraging your CD-ROM to run, please try the following.

- ▲ Run the 'Acrobat Reader' installation program provided on the CD (in the 'Reader Installer' folder).
- ▲ Check that your computer's system clock is set to the correct date.
- ▲ Make certain that Adobe 'Acrobat' or 'Acrobat Reader' is not open when you 'Launch the CLEAPSS CD-ROM'.

You can find a Frequently Asked Questions page for the CD-ROM at www.cleapss.org.uk/cdromfaq.htm or e-mail us at cdrom@cleapss.org.uk with your questions and comments. Please note that our licence agreement permits the CD-ROM to be made available to staff within your school or college via your network.

We have received favourable comments on the E-documents on the CD-ROM, particularly E232, *Common Safety Signs & Hazard Symbols*. Schools have requested an additional sign - 'No eating and drinking'. We have now produced this sign and you can download the file from the secure part of our web site (first click on 'Miscellaneous downloads'), using the 'Publications on the Internet' link page on the CD-ROM. Alternatively, schools can request their own password by e-mailing us at password@cleapss.org.uk and access the site from www.cleapss.org.uk/publications/. All our 'position statements', back copies of the *Bulletin* and an increasing variety of other materials are available there for download.

We intend to include even more material on the next edition of the CLEAPSS *Science Publications CD-ROM*. We are currently working on a CD-ROM of our *Model Risk Assessments for Design & Technology* and this should be sent automatically to CLEAPSS members later this year.

New Publications

Improving technicians' status

In *Bulletin* 115, we told you about forthcoming guidance to help schools improve their science technician provision. Guide L228, *Technicians and Their Jobs*, is now available. We hope that it will provide an essential resource on issues such as pay, hours and grades, job descriptions, working conditions and training. The recommendations it contains have been endorsed by the chairs of the House of Commons Select Committee on Science & Technology and the Royal Society Education Committee. Further guidance on the induction of new technicians will be issued next term.

Stick insects

We have now extended our guides to help schools keep and study a range of suitable animals. Guide L227, *Stick Insects*, provides all the relevant information on how to look after various species that should not be difficult for schools to keep. It discusses housing and feeding requirements (eg, find a nearby bramble bush!) and also includes background information on this fascinating group of animals. In addition, the guide provides lists of suppliers and publications, web sites for stick insect enthusiasts and suggestions for activities and observations.

Open evening accident

Serious accidents are bad at any time but when they occur at an open evening in front of pupils and their parents, the consequences are even more far reaching. At a recent event, the science department arranged a demonstration, in a fume cupboard, of the potentially very dangerous reaction between solid silver nitrate and magnesium powder on the addition of a drop of water. The danger is highlighted on *Hazard* 87. By some means, water entered a bottle of the reagents which exploded, burning brightly. Unfortunately, a technician was working at the fume cupboard at the time and received extensive burns to both hands. It is reported that the heat was so intense that her wedding ring melted. A light fitting was broken and glass injured a Y6 pupil visitor. We understand that the technician is making good progress and that skin grafts have been successful. If there are further developments to this incident, we will inform you in a later *Bulletin*.

We have been concerned about open evenings for some time and our new leaflet, PS 58, gives our guidance on organising these events. We often hear about spectacular reactions being carried out during these evenings, some by pupils with little supervision. Even more astounding is the observation that, after pupils have joined the school, they never see such demonstrations again!

CHIP changes

Following amendments to the *CHIP Regulations*, one Risk Phrase has been changed and a new one introduced:

- ▼ R40 Limited evidence of carcinogenic effects;
- ▼ R68 Possible risk of irreversible effects.

We suggest that you alter Table 7.12 in Section 7.8.1 of the *CLEAPSS Laboratory Handbook*.

The R68 phrase now applies to benzene-1,2,3-triol (pyrogallol) on *Hazard* 12 and to solutions of methanol between 3 and 10% (*Hazard* 40, Ethanol). On *Hazard* 92 (Sodium metabisulphite), please add the comment: "Serious risk of damage to eyes". The hazards of trichloroethene have also changed, requiring significant alterations to *Hazard* 99 (Tetrachloroethene) - see below.

.... and Recipe Cards & Hazcards Updates

We have recently made some changes to *Recipe Card* 21 for preparing Brady's reagent. We have now consolidated all the alterations made to the cards since 1999 into a pack, PS57, which includes new cards and instructions for hand-written amendments. Also, as discussed above, we have now produced a new version of *Hazard* 99 and updated pack PS35, which gives details of all changes to *Hazcards* made since 1995.

Schools can obtain PS57 and the new *Hazard* by visiting the secure part of our web site (see page 1) to download the files for printing onto card. Alternatively, please send a **C5, stamped, self-addressed envelope**, marked 'PS57/HAZ' in the bottom left-hand corner and we will send you copies of the new/revised cards.

Health & Safety Videos

We are often asked if there are videos on sale to help teach about health & safety to pupils. Our answer until now has been "nothing really", so when new materials are produced, even if they may not be entirely suitable for all tastes, we ought to be grateful.

Health & safety organisations in Europe and the UK have produced a series of videos to help those starting work. They have no spoken dialogue and the (few) words appear in many European languages. Because of the cartoon format adopted, the videos may appear to insult the intelligence of 16-year olds who surely feel they are adults now that they will soon be starting to work for a living. Nevertheless, the messages in the videos are serious and extension activities will be required to drive them home, whether they are used in schools with year 7 pupils as an introduction to health & safety or to prepare older students for work experience.

Best Signs Story (ISBN 0717618765; 12 minutes) is designed to explain the meaning of colour codes on signs. The cartoon workman (later called Napo) who disobeys the signs is not permanently injured by his stupidity, leading to the impression that the signs are just a joke.

Scratch and Sniff (ISBN 0717622525; 12 minutes) deals with the importance of hazard warning signs on chemicals. It is rather less critical of the worker, who sometimes draws the attention of his boss to the hazards. Again, some paper or discussion backup will be a distinct advantage.

The Adventures of Napo (ISBN 071762000X; 15 minutes, despite a longer time given on the label) features Napo the stupid workman who does everything wrong, sometimes because of pressure from his boss. It shows that problems are not always overcome by signs, eg, stairs need a handrail. It highlights the need for proper steps to reach heights and the requirement to cooperate with management. Finally, Napo creates havoc with a fork-lift truck illustrating the need for training before operating machinery or the value of having the appropriate equipment for manual handling. Unfortunately, the importance of protecting Napo's back from injury is not stressed.

Each video costs £25+VAT, inc p&p. There are discounts available if two or three videos are purchased together.

HSE Books Tel: 01787 881165
PO Box 1999 Fax: 01787 313995
Sudbury CO10 2WA Web site: www.hsebooks.co.uk

New Model Risk Assessments for D&T

We have produced some new risk assessments for part 1, *Work with Resistant Materials*, and also amended the contents page and index. The new materials will be included on the free CD-ROM to be sent out later this year. However, if schools require the new sheets before the CD-ROM arrives, they can download them from our web site or send an **A4, self-addressed envelope, stamped to the value of 44p**, marked 'MRATs', for paper copies. We would be grateful if members of science departments could bring this news item to the attention of their D&T colleagues.

Tips for Technicians

Unsticking labels

Ever had the problem of removing self-adhesive or other gummed labels from glassware and being left with a residue of adhesive that is difficult to scrape or wash off? If so, try filling the bottle, etc with boiling water. Hopefully, this will soften the glue and allow the (dry) label to be peeled off. It works for the labels we use!

Warning! - Microscopy activity masters

Schools may have a copy of *Microscopy Photocopy Activity Masters*, from Hands-On Publishing. Investigation 2, *Looking at Animal Cells* suggests an inappropriate means of sampling cheek cells (our leaflet PS6 gives a safe method). Investigation 4, *Examining Bacteria* is downright dangerous! We cannot imagine teachers wishing to carry out the activity as described (allowing meat to rot in water to produce a bacterial broth!) but anyone tempted to have a go would be well advised to think again.

ICT in science...more than just datalogging!

Ofsted reports often criticise the lack of ICT (Information Communications Technology) provision in science departments. A new, free, 28-page booklet called *ICT In Support of Science Education: A Practical User's Guide* explains how ICT can be used to enhance the delivery of the science curriculum.

It details the benefits of integrating ICT into science teaching. Applications of whole-class viewing systems, web sites, simulation software, datalogging, video playback, video cameras and microscopes are discussed. The use of a school intranet as a platform for commercial and home-produced on-line learning resources is also explained. The associated need to provide training and develop appropriate ICT skills for teachers and technicians is emphasised. Contacts are included for science software and various ICT equipment suppliers.

ICT In Support of Science Education is published by the University of York Science Education Group with the support of the Salters' Institute. It has been distributed free to all 2500 secondary schools involved in the Salter's Festival of Chemistry. No more printed copies are available, but the publication can be downloaded free in electronic form from the web site below.

www.york.ac.uk/org/seg/about_us/pages/ict_download_page.htm

A link to this site is available in the 'News' section of our web site, should you not wish to type it all out!

Apologies to Scitech!

In *Bulletin 115*, we told you about *Scitech* - the e-mail discussion group for science technicians. Unfortunately, we managed to misprint the e-mail address of the organiser. Our apologies to Valery and to those who had difficulty making contact. Here is the correct address. valery@cobb777.fsnet.co.uk

Take your partner...

The Royal Society's *Partnership Grants Scheme* offers grants of £250-£2500 for teachers and scientists or engineers to work together on creative investigations involving 5-16 year olds. For successful applicants, the grant is awarded directly to the school, enabling the purchase of any specialist equipment needed for the investigation, payment of travel expenses for the scientist/engineer and/or the school group and possibly teacher supply cover.

The next closing date for applications is 14 February 2003. For more details, contact the Education Officer, Kirsty Brown.

Partnership Grants	Tel: 020 7451 2561
The Royal Society	Fax: 020 7451 2693
Carlton House Terrace	E-mail: kirsty.brown@royalsoc.ac.uk
London SW1Y 5AG	Web site: www.royalsoc.ac.uk/education/partnership.htm

Use of acetylene in D & T workshops

D & T departments may use oxy-acetylene for welding or other purposes. Safety issues are covered in our *Model Risk Assessments for Design & Technology in Secondary Schools*, especially sheets 1.023, 1.024 & 1.025. Our advice still stands. However, recent guidance from the Home Office to fire brigades has resulted in changed procedures for fighting fires in which acetylene cylinders may be involved. In most cases, fire officers now require an evacuation zone of 200 m or more, and enforce it for 24 hours or longer. This would obviously be highly disruptive not only to the school but, in built-up areas, to the whole neighbourhood. Schools may therefore come under pressure to use alternatives such as MIG welding or LPG for brazing. You may wish to add this to the *Further Information* section on sheet 1.025.

e-Learning Credits

Science departments, don't miss out! The government has released £30 million of these credits for schools to purchase approved software and ICT resources. Get your bids in soon! Visit the following web sites for more information.

www.curriculumonline.gov.uk/

www.besonet.org.uk

www.publishers.org.uk

CLEAPSS courses coming soon

Details of our courses, up to half term in May 2003, are listed below. Most sessions are for *technicians*, unless otherwise indicated.

Biology Safety: Devon; Hampshire.

16 Banned Chemistry Experiments (Teachers + Technicians): Coventry.

Chemical Handling I: Bristol; Kent; Salford; Staffs; Surrey.

Chemical Handling II: Hampshire; Herts; Newport; Oldham.

Chemical Storage: Kirklees.

Datalogging: Shropshire; Staffordshire; Surrey.

Second Electrical: Hampshire; Kirklees.

Electrical Testing: Bromley; Coventry.

Fume Cupboard Monitoring: at CLEAPSS.

Health & Safety: Birmingham; Leeds; Norfolk; Reading; Rotherham; S London; Suffolk; Warwickshire; Wirral; York.

Health & Safety Risk Assessment (Teachers): N Tyneside.

Health & Safety Management (Heads of D&T): Isle of Wight; Solihull.

Health & Safety Management (Heads of Science): Bristol; Isle of Wight; Milton Keynes; Norfolk; N Wales; Reading.

Manual Handling: Kirklees.

Microbiology: Devon; Hampshire; Leicester; W Sussex.

Microscale Chemistry: Salford.

Microscope Maintenance: Malvern.

Physics Topics: Hampshire; Northamptonshire; Surrey.

Radiation Protection Supervisors (Teachers): Kent; Northamptonshire; Stoke.

Information on all courses can be found on our web site; these indicate the items that participants should bring with them for a particular course. For courses organised by LEAs, you will need to book directly with the LEA concerned. Some will give priority to their own schools. For details of the person organising the course in an LEA, please ring us and ask for Alison or Caroline; this information cannot be included on our web site. Invitations to courses arranged by CLEAPSS will be sent to schools in the area of the host establishment but anyone who is able to travel to the course venue is welcome to apply. *If courses of interest are not being held in your area, please contact us; we may be able to organise something.*

CLEAPSS PUBLICATIONS

Free guides and other materials

Guides marked 'R' mainly contain retail information about the cost and availability of resources; other guidance may be given. For help with buying items **not** covered by a listed guide, please call our **Helpline**. Guides marked 'L' cover specialist topics, items written since the relevant section of the *Laboratory Handbook* was completed and other information; details of equipment may also be included. Publications marked 'PS' are brief documents, often updated, that outline our views on topics of current interest. (Check dates; these may indicate a revision.) *All PS publications are now on the secure part of our web site.*

Note: Some of our older or less-popular items are not listed here. Details are on our web site, as is a copy of the Bulletin index.

General Equipment, Labs/Workshops, Management, Safety

- R9a FUME CUPBOARD DATA SHEETS (Feb '01)
- L14 DESIGNING & PLANNING LABORATORIES (Mar '00) (+ PS14)
- R45 VACUUM PUMPS (Dec '98)
- R57 COLORIMETERS (May '00)
- L77 SCIENCE FOR PUPILS WITH SPECIAL NEEDS (Jan '00)
- R135 EYE & FACE PROTECTION (Apr '98)
- L164 PORTABLE LABORATORY GAS BURNERS (Sep '95)
- L196 MANAGING RISK ASSESSMENT IN SCIENCE (Jul '97)
- L214 EXAMINING AUTOCLAVES etc (Aug '00)
- L216s INSPECTING SAFETY IN SCIENCE (Sep '96)
- L223 MODEL SCIENCE HEALTH & SAFETY POLICY (Jul '98)
- ★L228 TECHNICIANS & THEIR JOBS (New; see page 2)
- PS7 CENTRIFUGES (Sep '97)
- PS9 SCIENCE CLASS & LABORATORY SIZES: SAFETY (Apr '01)
- ★PS14 LAB FURNITURE & FITTINGS (Nov '02) For use with L14.
- PS16 BUNSEN BURNER TUBING (Jan '02)
- ★PS21 HEALTH & SAFETY IN LABORATORIES and NQTs (Oct '02)
- PS24 AUTOMATIC DISHWASHERS (Jul '01)
- PS25 RISK ASSESSMENTS: LAB TECHNICIAN ACTIVITIES (Mar '97)
- PS30 MONITORING SCIENCE SAFETY POLICIES (Jul '00)
- ★PS38 TRAINING FOR SCIENCE STAFF etc. (Oct '02)
- ★PS44 THE CASE PROJECT: SAFETY & RESOURCES (Oct '02)
- ★PS45 REFILLING CARBON DIOXIDE CYLINDERS (Oct '02)
- PS47 CLEAPSS SERVICES FOR TRAINEE TEACHERS (Aug '01)
- ★PS48 FUME CUPBOARD & LEV TESTING CONTRACTORS (Nov '02)
- PS49 FIRE RISK ASSESSMENTS FOR SCHOOL LABS (Feb '02)
- PS50 GLOVES AS PERSONAL PROTECTIVE EQUIPMENT (Sep '01)
- PS51 THE QUALITY OF TEST TUBES (Jul '01)
- ★PS54 WATER FITTINGS (Oct '02)
- ★PS58 OPEN EVENINGS & PRIMARY SCHOOL LIAISON (New; see p. 2)
- ★INDEX CLEAPSS BULLETIN INDEX (For issues 77 - 116)

Design & Technology

- PS31 DISPOSAL OF WASTE IN TECHNOLOGY (Mar '01)
- PS33 MDF (Medium Density Fibreboard) (Jul '00)
- PS53 3 METHODS OF ETCHING COPPER-CLAD BOARDS (Sep '01)

Information Technology

- ★PS56 DATALOGGING EQUIPMENT (Oct '02)

Mainly Biology

- R24s BUYING MICROSCOPES for secondary schools (Jul '02)
- L52 SMALL MAMMALS (Apr '94)
- L71 INCUBATING & HATCHING EGGS (Mar '97)
- R101 EQUIPMENT FOR STEAM STERILISATION (Apr '01)
- L197 GIANT AFRICAN LAND SNAILS (Apr '92)
- L201 GIANT MILLIPEDES (Dec '92)
- L206 TADPOLES (Sep '94)
- L213 SCIENCE WITH MINIBEASTS: SNAILS (Sep '95)
- L221 DEVELOPING & USING ENVIRONMENTAL AREAS (Dec '98)
- L226 CARNIVOROUS PLANTS (Nov '01)
- ★L227 STICK INSECTS (New; see page 2)
- PS1 POND DIPPING & WEIL'S DISEASE (Mar '96)

- PS2 THE DISSECTION OF EYES (Feb '01)
- PS3 USING ANIMALS & PLANTS: Formulating a policy (Mar '96)
- PS6 CHEEK CELL SAMPLING (May '96)
- ★PS10 BURNING PEANUTS and ALLERGIES TO NUTS (Oct '02)
- PS11 HUMAN BLOOD SAMPLING (Oct '99)
- PS27 HUMAN BODY FLUIDS (Jun '97)
- PS34 MICROBIOLOGY WORK IN SPOTLIGHT SCIENCE (Jun '02)
- PS55 BRINGING PETS and other animals into schools (Apr '02)

Mainly Chemistry

- L195 SUBSTITUTE CHEMICALS (Extended Sep '94)
- L202 SPECTRA (for various organic substances) (Sep '00)
- L215 MICROSCALE ORGANIC CHEMISTRY (Jan '96)
- ★PS35 HAZCARDS UPDATES '97, '00, '02 (Nov '02)
- ★PS57 RECIPE CARDS UPDATES (Oct '02)

Mainly Physics

- R82 ELECTRONIC METERS (Apr '99)
- R92 MEASUREMENT OF RADIOACTIVITY (Feb '01)
- L93 MANAGING IONISING RADIATIONS etc (Aug '01)
- R151 AMMETERS etc (Apr '98)
- L194 EARTH IN SPACE: KEY STAGES 3 & 4 (Jul '99)
- R231 GAS LAWS: Experiments and Apparatus (Jul '02)
- PS28 RADIANT HEATERS IN PHYSICS (Sep '00)
- PS46 RADIATION PROTECTION, a guide for employers (Mar '02)
- PS52 LASERS (Aug '01)

Repair and Maintenance

- L103 EQUIPMENT REPAIR (Apr '99) [Sent with lists of repairers: ★PS40 (Nov '02); ★PS41 (Nov '02); ★PS42 (Nov '02); ★PS43 (Nov '02)]

Materials for which there is a charge

CLEAPSS CD-ROM (For PCs & Macs)

One issued free; Additional CD: 3-year subscription £30.00

CLEAPSS Laboratory Handbook

Binder £4.50; Binders (two) + all contents £27.00;
6th issue (2001) £6.50; Individual chapters £1.50 each

CLEAPSS Shorter Laboratory Handbook

Binder + all contents £13.50 For use in middle, prep & some special schools and pupil referral units.

Hazcards 2000 update of 1995 edition

1 or 2 sets £9.00 per set; 3 - 9 sets £8.50 per set; 10 + sets £8.00 per set

Recipe Cards 2002 update of 1999 edition £3.00 per set

Student Safety Sheets (Combined issue 2000)

For establishments that need a further set. £4.00

Model Risk Assessments for Design & Technology

Part 1 For work with resistant materials £5.00

(For extra sets of revised part 1 pages, send stamps valued 44p.)

Parts For work with compliant materials and with foods

2 & 3 (Not available separately) £5.00

Parts 1, 2 and 3 combined £10.00

Hazardous Chemicals CD2 (SSERC)

Invaluable for A-level work, CLEAPSS members and Associates can buy this interactive CD-ROM (revised Jan 2002) for PC or Mac computers, at the reduced price of £80 [£40 if hard copy or first CD have already been purchased]. (Note that the paper *Hazardous Chemicals Manual* is no longer in print.) **Do not use this order form or send money.** Send a separate order to us; this will be forwarded to SSERC who will send the CD2 directly to you.

You can order items by letter, phone, fax, e-mail or from our web site.

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Please print your name clearly, give your address and the name of your LEA, if applicable. You can copy this page and mark the items you need.

Please complete using block capitals, and a black pen, if faxing this page to us.

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Address

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LEA (if applicable) Associate member (Please circle if applicable)