



CLEAPSS: Supporting Safe and Effective Practical Work in School Science

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Membership of CLEAPSS enables members to access advice and guidance which is recognised as best practice by the Health and Safety Executive and the Department for Education. Approximately 28,000 schools and colleges are members covering students aged 5 – 19. Membership is predominantly in England, Wales and Northern Ireland although CLEAPSS has over 300 overseas members across 69 countries. CLEAPSS resources give teachers ideas for exciting and engaging practical activities that fire pupils' imaginations and then, unlike many other sources of ideas, go on to show teachers and technicians in detail how to translate these ideas into safe and exciting classroom experiences. CLEAPSS provides information through its publications, courses and videos, and by e-mail and telephone via its Helpline. All of the published material is on the CLEAPSS website; most requires a member log-in but some resources are free to all.

CLEAPSS serves:

- teachers & technicians
- Head teachers and senior managers of schools
- science advisers/inspectors/consultants
- teacher trainers
- health and safety advisers
- architects (working for subscribers)
- national and local government officers
- learned bodies of scientists
- school governors
- Suppliers of equipment and chemical & biological; materials to schools

PUBLICATIONS & HELP

CLEAPSS keeps subscribers up to date on health & safety regulation, practical methods, laboratory management, and using:

- an extensive range of face to face courses
- a news Bulletin each term
- Hazcards for chemical safety
- a Recipe Book
- guidance leaflets
- authoritative, detailed Guides and,
- a *Helpline* by phone or email so members can talk to us directly to get immediate assistance.

RECIPE SHEETS

Formula: NaOH	Solubility: 108 g per 100 cm ³	Molar mass: 40.00 g mol ⁻¹		
Mass (g) of solid sodium hydroxide to be used				
Concentration required	Volume (cm ³) of solution required			Hazard warning label
	250	1000	2500	
0.01 M	Ten-fold dilution of the 0.1 M solution			-
0.1 M	Ten-fold dilution of the 1 M solution			-
0.4 M	4.00	16.00	40.00	WARNING
1.0 M	10.00	40.00	100.00	DANGER
5.0 M	50.00	200.00	500.00	DANGER

Hazcards & Recipe Sheets enable the safe use of chemicals and preparation of solutions and gases. Student Safety Sheets are freely available on <http://www.cleapss.org.uk> From these students can learn to produce their own risk assessments.

OVER 50 VIDEOS (free on www.youtube.com/user/CLEAPSS)

Electric field demo - with castor oil and semolina
2,556 views • 1 year ago

Microwave speed of light
1,913 views • 1 year ago

Rubens Tube
1,201 views • 1 year ago

How to set-up a Woodlice Colony
2,488 views • 1 year ago

Polymerisation - A new method
1,856 views • 1 year ago

CLEAPSS' advice covers:

- health and safety for practical work, including model risk assessments,
- chemicals, living organisms, equipment,
- laboratory design, facilities and fittings,
- technicians and their jobs,
- Design & Technology and art practical equipment and facilities.

HAZCARDS FOR CHEMICAL SAFETY

91A Risk Assessment Guidance		Sodium hydroxide, NaOH
Sodium hydroxide caustic soda		NaOH (40.00)
Soda lime and Carbosorb		
	Causes severe skin burns and eye damage [H314]. This substance (sodium hydroxide) is dangerous in contact with: • WATER. A vigorous exothermic reaction occurs. So much heat is evolved that boiling could occur. A choking mist is often formed as the solid dissolves. For full details on preparing solutions see Recipe Book 85. Seek additional guidance or training before attempting this procedure for the first time. • ZINC, ALUMINIUM. Hydrogen is evolved. Note also: • WEL (mg m ⁻³): 2.0 (STEL) sodium hydroxide	
Storage	CORROSIVE SOLID (CS) [White solid: beads, pellets, powder - sodium hydroxide; granules - soda lime] Sodium hydroxide. Absorbs both water and carbon dioxide from the atmosphere. If the solid forms a cake, it may be necessary to dispose of it (caked solid will still be corrosive). Solutions absorb carbon dioxide from the atmosphere (a white solid will collect around the lid/stopper). Dilute solutions are particularly affected and are best stored in plastic screw-top bottles – avoid the use of 'polystop' bottles. See also Recipe Book 85. Soda lime: Soda lime is used to absorb carbon dioxide. Approximate composition by mass: 5% NaOH, 1% KOH, 0.2% silica, 14-19% water and Ca(OH) ₂ to make a total of 100%. Self-indicating soda lime (eg. Carbosorb) changes colour when its carbon dioxide-absorbing capacity is exhausted. Soda lime can also be used to absorb corrosive acidic fumes (eg. from bromine and acid chlorides during storage).	
Emergencies	Follow standard procedures in Section E, <i>About Hazcards</i> (GL 120), BUT NOTE: • If sodium hydroxide solution and/or soda lime particles enter the eyes: immediately irrigate the eye with gently-running water and call for a first-aid to assist. Remove contact lenses if present and easy to do, and continue irrigating. Call the emergency services, tell them the quantity of chemical(s) involved and ensure that irrigation is continued until the patient is handed over to qualified medical staff. • General spills: Neutralise contaminated mineral absorbent with 1 M ethanoic acid solution.	

This Hazcard should be read in conjunction with guidance leaflet About Hazcards (GL 120), which provides additional important information. ©CLEAPSS Aug 2014

91A Risk Assessment Guidance		Sodium hydroxide, NaOH
Detailed guidance on specific activities and techniques involving this substance can be found in the Practical Procedures section of the CLEAPSS website: www.cleapss.org.uk		
General use of:	Hazard information	User* Suggested general control measures and guidance
Soda lime and solid sodium hydroxide		• Wear splash-proof goggles or a face shield. • Wear chemical-resistant gloves for transferring large quantities of solid or solution. Use a spatula or forceps for transferring the solid. Avoid raising dust. • Gloves may also be advised for other practical procedures or for users with wounds or skin conditions. See activity-specific advice and/or GL 120. • Note: Students' use of small amounts of sodium hydroxide solid and solutions at higher concentrations is acceptable only if the teacher is confident that the risks can be adequately controlled. Design activities to minimise students' need to use or transfer concentrated alkali solutions or the solid. Disposal: W7 → 0.1 M, or W5. For solids see Disposal below.
Sodium hydroxide solutions ≥ 0.5 M	Causes severe skin burns and eye damage	TT (V9)
Sodium hydroxide solutions < 0.5 M and ≥ 0.125 M	WARNING Causes skin irritation and serious eye irritation	Y7 • Wear eye protection. • Gloves may be advised for some practical procedures or for users with wounds or skin conditions. See activity-specific advice and/or GL 120. Disposal: W7 → 0.1 M, or W5.
Sodium hydroxide solutions < 0.125 M	Currently, solutions below 0.125 M are not classified as hazardous but see Note.	• Wear eye protection even when dilute solutions are used. Note: Experience of the use of this alkali in school science activities indicates that it is appropriate to apply the control measures given here. It is advisable to include a warning to this effect on the label. Disposal: W7
Disposal	Provides an indication of the level of practical skill/competence typically required for using the chemical in this form or at this concentration. This guidance should be taken into account when checking, updating or customising risk assessments.	
Follow general guidance in Section F, <i>About Hazcards</i> (GL 120), BUT NOTE for the solid alkali: • Wear splash-proof goggles or a face shield. Wear chemical-resistant gloves. Use a spatula / forceps for transferring the solid. • Sodium hydroxide: Dissolve solid to make a 1 M solution then follow W5 using ethanoic acid (1 M) to neutralise. • Soda lime: Add solid to 1-2 M hydrochloric (or nitric) acid with stirring (~ 25 g of fresh soda lime would neutralise ~ 0.5 dm ³ of hydrochloric acid). When the solid has dissolved, pour the solution down a foul-water drain with more water [Wspec].		

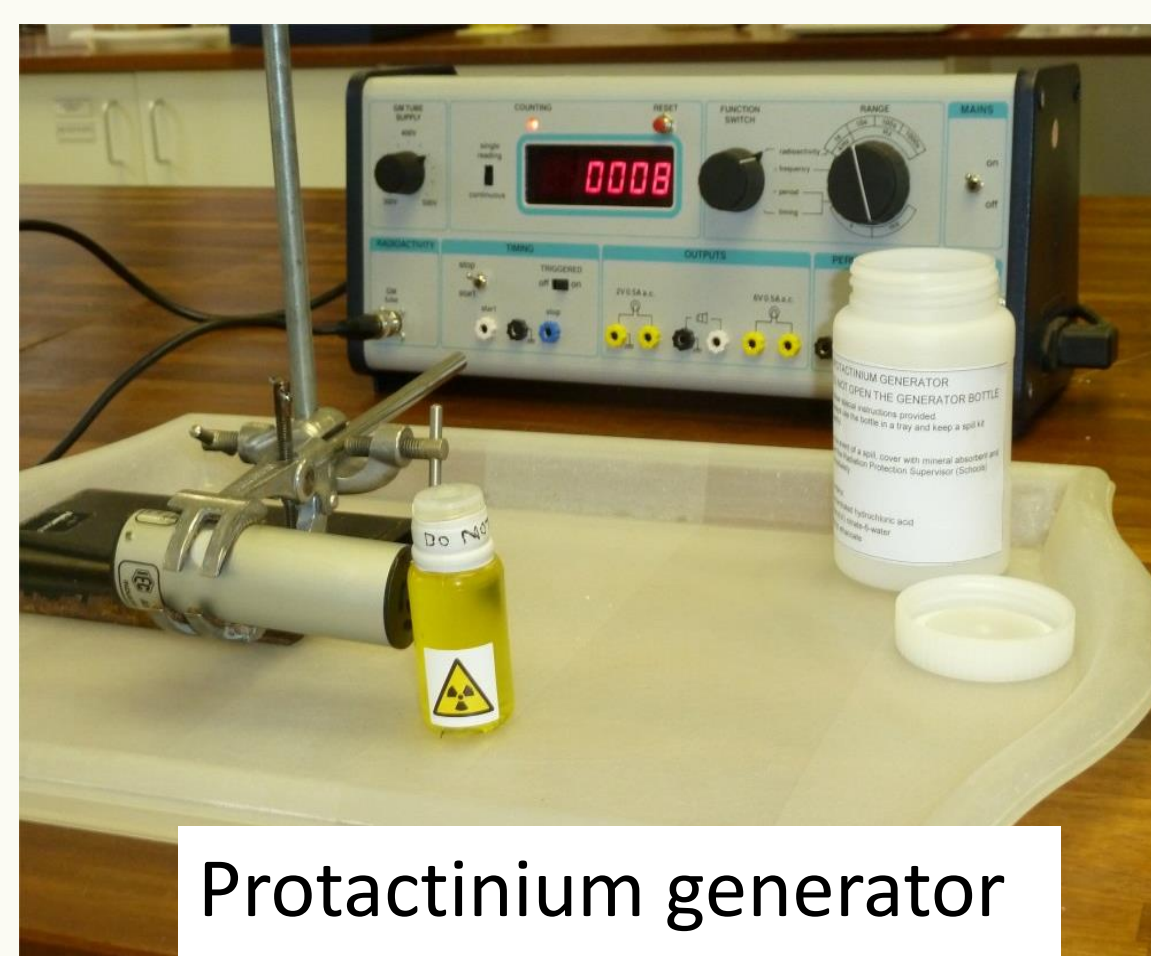
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BIOLOGY



CLEAPSS offers advice on safety, equipment and experiments. Examples include aseptic technique, getting tricky experiments to work and keeping invertebrates in the lab for study. CLEAPSS has established a recognised inspection procedure for pressurised vessels required for sterilisation. Hygiene is stressed in the preparation and clearing away of biological materials. CLEAPSS helps in bringing new practical techniques and information to teachers and technicians in areas new to the curriculum such as gene technology.

RADIOACTIVE MATERIALS

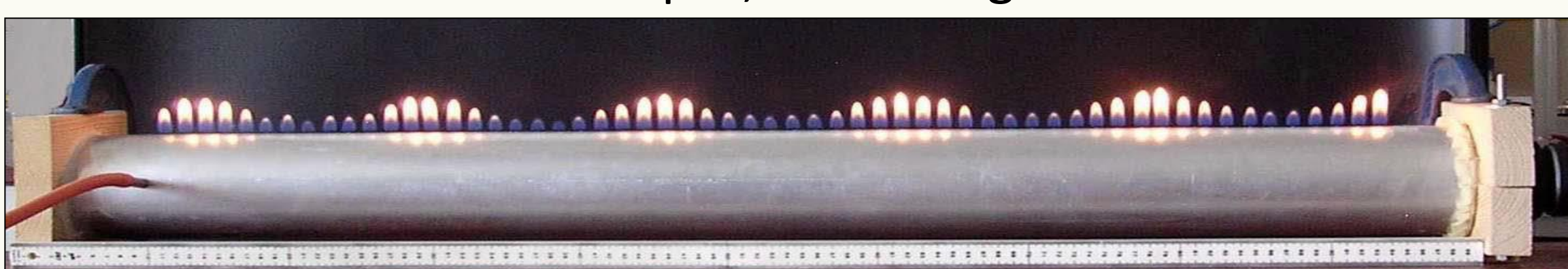


Guidance on the safe storage, use and disposal of radioactive materials for use in UK schools which is recognised by HSE and DFE. This material is freely available in L093 – *Managing ionising radiations and radioactive substances in schools*.

PHYSICS



Advice and support on safety, assistance with equipment and experiments is provided. Examples include using high voltages, Ruben's tube, looking at an eclipse, steam engines and lasers.



PRIMARY SCIENCE



We offer guidance to primary teachers in eg: handling chemicals, electrical circuits and biological material. Many teachers have little science background so we provide a dedicated primary newsletter with lots of ideas for practical activities along with appropriate explanations.

SAFETY MANAGEMENT

A guide is provided for Heads of Science to establish protocols in their department, such as agreed risk assessment procedures, dealing with emergencies, etc.



CLEAPSS' training courses aim to:

- raise awareness of current and significant safety issues in science teaching.
- develop a better understanding of what is required by health and safety legislation.
- consider the implications of this for the management of safety in science departments.
- consider the risk assessment process, as required by UK Law
- understand the uses of a safety policy and how it can be monitored.

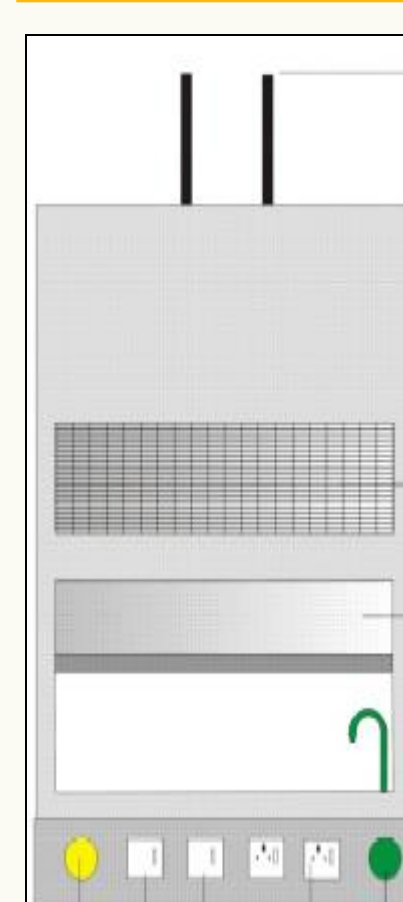
HAZARDOUS PROCEDURES & THE HELPLINE



CLEAPSS carries out research and provides instructions (called *Supplementary Risk Assessments*) to enable teachers to safely carry out demonstrations and experiments, with a higher degree of risk. CLEAPSS answers over 7000 enquiries a year on the *Helpline* from technicians and teachers usually about safety in practical work. And we do, very occasionally say "No".

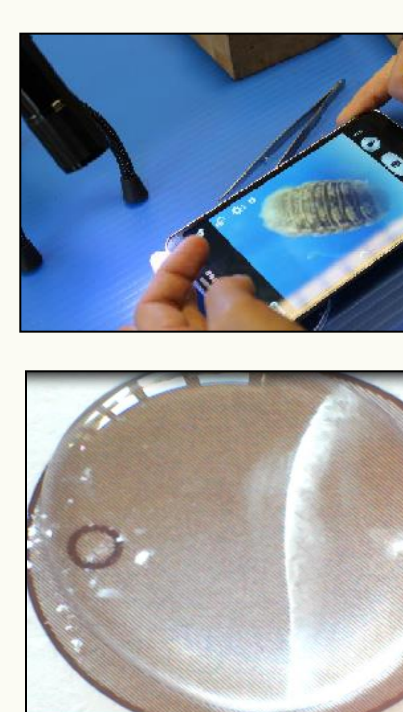


LAB DESIGN AND FUME CUPBOARDS



Assistance is provided to schools and architects on lab design. Originally produced with government funding, the guide *G14 Designing and planning laboratories* is freely available on www.cleapss.org.uk Recent work carried out on behalf of the Dept. for Education has led to the production of updated guidance on fume cupboards (hoods) suitable for schools.

NEW IDEAS



CLEAPSS advisors are always on the look out for new ideas for practical work suitable for schools. Recent examples include gene technology, microchemistry and using mobile phones as microscopes. Advisors regularly demonstrate these at conferences and have appeared on TV.