GL069 - BANNED CHEMICALS AND OTHER MYTHS 2024

In 2005, CLEAPSS was commissioned by the Royal Society of Chemistry (RSC) to investigate whether effective teaching of practical science was being inhibited on spurious health and safety grounds. In particular, we investigated alleged bans on the use of various chemicals or particular procedures that were commonly used in the past. The full report, *Surely That's Banned?*, is available on the RSC web site - there is a link to this from the CLEAPSS web site, www.cleapss.org.uk. A paper copy of the main report (without the statistical appendices) was sent to all secondary schools in autumn 2006.

As part of the research, a questionnaire was sent both to schools and local authority officers. Included in this was a list of 40 chemicals or procedures that some callers to the CLEAPSS *Helpline* had thought banned. Of these, only two were banned nationally, although most of the others require a risk assessment and in some cases involve some restrictions. Over 60% of the local authority officers who replied stated that their authority had no additional bans. However, schools were under the impression that much, much more was banned or discouraged. Hence the science curriculum for many children was being impoverished unnecessarily.

This guidance is an attempt to overcome these mistaken views. It lists the 40 chemicals or activities in the original questionnaire, comments on any bans and gives guidance on where to obtain further information about the healthy and safe use of the chemical or procedure. Unless otherwise indicated, the publications referred to are all on the CLEAPSS web site http://science.cleapss.org.uk/. Access to the relevant part of the CLEAPSS web site requires a username and password. These are changed from time to time and the information circulated to members. However, if you cannot find the information, telephone the CLEAPSS *Helpline* 01895 251496. Do **not** rely on a paper publication, unless you are sure it is up to date.

We have also expanded the list beyond the original 40 items and may add to this in the future if more myths come to light. Updated versions of this leaflet will appear on the CLEAPSS web site from time to time. **If there are other chemicals or activities which schools believe may be banned, please contact our *Helpline* (01895 251496 or e-mail science@cleapss.org.uk). We will be able to confirm whether they really are banned nationally or, more probably, tell you where to find a model risk assessment and/or CLEAPSS guidance on how to carry out the activity or use the chemical safely.**

Please note that this table only gives information about **national** bans in the UK**. Other countries may have quite different restrictions. Even in the UK it is possible that a particular employer may have banned something that is not banned nationally, although this is unlikely.** Under section 13 of the *Management of Health and Safety at Work Regulations* (or the equivalent in Northern Ireland) all employers are obliged to ensure that new staff, or those newly-promoted or whose job changes significantly, are provided with adequate health and safety training and information. Self-evidently, this would include informing staff about any local bans. If employers fail to provide adequate training or information, they have committed a criminal offence. Therefore, if no such training or information has been provided, it is reasonable to assume that there is no ban issued by the employer. **If there is indeed a local ban, then employees have a legal duty to comply with it** – but can consider challenging it, if appropriate.

The employer for staff in England and Wales in many maintained schools (community and voluntary-controlled schools) is the local authority. The employer in foundation, voluntary-aided or free schools, academies and most other independent schools is the governing body but for some independent schools it might be the proprietor or a charitable trust and for multi-academy trusts it is the trust body.

In Northern Ireland, the Education Authority (EA) replaced the Education & Library Boards in 2015. The EA is the employer of technicians in all schools except voluntary grammar and grant-maintained integrated schools where the school's Board of Governors is the employer. For teachers, the EA is the employer in controlled schools (including controlled integrated and controlled grammar schools), the Council for Catholic Maintained Schools (CCMS) in maintained schools and the school's Board of Governors is the employer in voluntary grammar, grant-maintained integrated and most Irish medium schools (except for the few controlled Irish medium schools).

General		
Allegedly-banned chemical or activity	**Status of alleged ban**	**Guidance on healthy and safe practice and/or model risk assessments**
Use of mercury thermometers	There is a ban under the *REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) Regulations* 2006 (as amended) on the **sale** of all thermometers and other measuring instruments containing mercury to both the general public and professional users. Antiques are exempt, ie items more than 50 years old. Existing thermometers can continue in use. Risk assessment needed.	There is no requirement for schools to stop using or dispose of their existing mercury thermometers but they will be unable to replace them if they break. The risk assessment should cover minimising the risk of breakages and taking steps to ensure there is an effective clear-up procedure in case a breakage does occur. It is difficult to find alternatives to mercury thermometers in some contexts at manageable prices. Whilst the situation is improving, alternatives will not generally give readings accurate to 0.2 °C nor reach up to 300 °C. To give accurate readings, liquid-in-glass thermometers must be immersed to the correct depth. This is often not possible in school science and mercury thermometers are more tolerant of such variations. See CLEAPSS *Laboratory Handbook* 10.7.2. Digital thermometers are improving. Some have a thin probe, small enough to be inserted next to a capillary tube in a traditional melting point apparatus. Many now give a resolution of 0.1 °C, but their accuracy may only be ±0.3 °C or even ±1.0 °C. Unfortunately, catalogues are not always very clear about accuracy. Less accurate thermometers with good resolution will be satisfactory for measuring temperature changes (common in school science work) but less so if the actual temperature is required.
Use of mercury metal generally	See *Mainly physics*	
Use of mercury compounds	See *Mainly chemistry*	

Mainly biology		
Allegedly-banned chemical or activity	**Status of alleged ban**	**Guidance on healthy and safe practice and/or model risk assessments**
Keeping small mammals	No national ban but under the *Animals (Scientific Procedures) Act* there must be no cruelty to vertebrates. Risk assessment needed.	See CLEAPSS leaflet GL377 *Choosing small mammals to keep in the science department.*
Keeping giant African land snails	No national ban. Risk assessment needed.	See CLEAPSS leaflet GL380 *Choosing invertebrates to keep in the science department* and leaflet PS064 *Are we allowed to …? (Biology FAQs).*
Inflating a sheep's lung (eg, with bellows)	No national ban. Risk assessment needed.	See CLEAPSS leaflet GL397 *Investigating Lungs* and PS064 *Are we allowed to …? (Biology FAQs).*
Using a choice chamber with woodlice	No national ban.	See CLEAPSS leaflet PS003 *Keeping and using animals and plants: towards a science department policy* and CLEAPSS video *Setting up an indoor woodlice colony.*
Anaesthetisation of Drosophila *and similar organisms using ether*	No national ban. Risk assessment needed.	See CLEAPSS leaflets GL198 *Anaesthesia and euthanasia* and PS064 *Are we allowed to …? (Biology FAQs)* and CLEAPSS *Bulletin* 106.
Bringing spawn of the common frog from a pond into school	No national ban for the common frog or toad (but fully-protected species of amphibians, the Natterjack toad and the Great crested newt, are banned under the *Wildlife and Countryside Act*).	See CLEAPSS Guide GL415 *Keeping (Frog) tadpoles*
Dissection of eyeballs	No national ban on eyes from most species but under the *Animal By-products (Enforcement) Regulations* (or Northern Ireland equivalent) cattle eyes must be from animals slaughtered at less than 12 months, eyes of sheep and goats from animals slaughtered at less than 12 months or before they have any erupted incisors. Risk assessment needed. Schools in Northern Ireland wishing to use any animal by-product for educational purposes must have previously made a one-off application for registration using form *ABPR 7 (Education) Registration Application* from the Department of Agriculture, Environment and rural Affairs (DAERA). See EA Circular 2018-0411-1A, dated 12th April 2018.	See CLEAPSS leaflets GL398 *Eye Dissection* and PS064 *Are we allowed to …? (Biology FAQs)*
Dissection of hearts	No national ban. Risk assessment needed. Schools in Northern Ireland wishing to use any animal by-product for educational purposes must have previously made a one-off application for registration using form *ABPR 7 (Education) Registration Application* from the Department of Agriculture, Environment and rural Affairs (DAERA). See EA Circular 2018-0411-1A, dated 12th April 2018.	See CLEAPSS leaflets GL395 *Heart dissection* GL396 *Chicken heart dissection* and PS064 *Are we allowed to …? (Biology FAQs).*

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
Dissection of brains	No national ban on brains from most species but under the *Animal By-products (Enforcement) Regulations* (or the Northern Ireland equivalent) brains must be from animals slaughtered at less than 12 months, brains of sheep and goats from animals slaughtered at less than 12 months or before they have any erupted incisors. Risk assessment needed. Schools in Northern Ireland wishing to use any animal by-product for educational purposes must have previously made a one-off application for registration using form *ABPR 7 (Education) Registration Application* from the Department of Agriculture, Environment and rural Affairs (DAERA). See EA Circular 2018-0411-1A, dated 12th April 2018.	In practice it will usually be easiest to acquire and dissect a pig's brain. See CLEAPSS leaflet GL309 *Brain and head dissection*
Dissection of rats	No national ban. Risk assessment needed. Schools in Northern Ireland wishing to use any animal by-product for educational purposes must have previously made a one-off application for registration using form *ABPR 7 (Education) Registration Application* from the Department of Agriculture, Environment and rural Affairs (DAERA). See EA Circular 2018-0411-1A, dated 12th April 2018.	See CLEAPSS leaflet GL393 *Dissection.*
Pupils taking samples of their own cheek cells	No national ban. (A previous ban in Northern Ireland was rescinded in EA Circular No: 2018-0109-1A, dated 16th January 2018.) Was strongly discouraged by DES in 1980s, but later modified. Almost all local authorities rescinded their bans in the 1990s. Risk assessment needed.	See CLEAPSS leaflets PS064 *Are we allowed to …? (Biology FAQs)* and *Practical procedure* PP033 *Staining and observing cheek epithelial cells*.
Pupils using their own saliva in practical work	No national ban. (A previous ban in Northern Ireland was rescinded in EA Circular No: 2018-0109-1A, dated 16th January 2018.) Has never been discouraged by UK government. Risk assessment needed.	See CLEAPSS leaflet PS064 *Are we allowed to …? (Biology FAQs)* and GL204 *Studying human saliva and urine*.
Pupils taking samples of their own blood	No national ban. (A previous ban in Northern Ireland was rescinded in EA Circular No: 2018-0109-1A, dated 16th January 2018.) Was very strongly discouraged by DES in 1980s, but later modified. Risk assessment needed.	See CLEAPSS guide GL200 *Studying blood*, customisable letter DL200 *Taking human blood samples* and leaflet PS064 *Are we allowed to…? (Biology FAQs)*..
Incubating 'finger dabs' on agar plates	No national ban. Risk assessment needed.	See CLEAPSS leaflet PP051 *Environmental swabbing and finger dabs.*

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
Use of bleach [sodium chlorate(I), sodium hypochlorite] as a disinfectant	No national ban. Some employers have banned the use of bleach for cleaning purposes but it is needed for some tasks in biology. In cases of doubt, science departments should inform their employer that they assume the ban does not apply to the use of sodium chlorate(I) in science and will continue to use it unless instructed to the contrary in writing. Risk assessment needed.	See CLEAPSS leaflet GL275 *Disinfectants for microbiology.*
Burning peanuts in experiments	No national ban but allergy is a common problem. There are alternatives. Risk assessment needed.	See CLEAPSS leaflets PS010 *The burning peanut investigation and allergies to nuts* and PS064 *Are we allowed to …? (Biology FAQs)* and *Laboratory Handbook*, section 9.4.2.
Demonstration of smoking machine	No national ban but under the *Smoke-free (Exemptions and Vehicles) Regulations* in England or the equivalent in devolved administrations, it must be done in a designated fume cupboard (or outdoors). Risk assessment needed. Some or all of the department's fume cupboards can be designated in the departmental *Health & Safety Policy* or equivalent.	See CLEAPSS *Practical procedures* TL002 *Cigarette smoking* and guide G223 *Model Health and Safety Policy for Science Departments* section 6.1 (customisable version DL223).
Using sphygmomanometers	No national ban. Risk assessment needed.	See CLEAPSS *Laboratory Handbook*, section 15.11.
Using spirometers	No national ban. Risk assessment needed.	See CLEAPSS *leaflet* GL201 *Breathing investigations*
Storing preserved biological specimens in methanal solution (formaldehyde solution, formalin) [Other uses of methanal, see *Mainly Chemistry*]	No national ban. Risk assessment needed.	Safer alternatives exist and should be used for new specimens and for older ones if replacement of the fluid is advisable. See CLEAPSS *guide* GL374 *Handling and maintaining preserved biological specimens, and disposal.*
Possessing human bones or partial or complete human skeletons *Possessing human cells on microscope slides* *Possessing human remains preserved in formalin etc*	No national ban. The Human Tissue Authority (HTA) states that human material used **for teaching biology** in schools is not being stored for a scheduled purpose under the *Human Tissue Act* 2004. These schools do **not** require a licence from the HTA to store human material for teaching.	See CLEAPSS *guide* GL374 *Handling and maintaining preserved biological specimens, and disposal.* A licence may be required for **public display** of material which does not normally require a licence. See HTA for more information on keeping human specimens in schools. *https://www.hta.gov.uk/policies/storage-human-material-teaching-schools-and-colleges.*

Mainly chemistry		
Allegedly-banned chemical or activity	**Status of alleged ban**	**Guidance on healthy and safe practice and/or model risk assessments**
Storage of toxic chemicals	All hazardous chemicals (ie, anything with a hazard warning label) must be kept secure. Under old regulations, pharmacists had to keep drugs, etc in a poisons cupboard but these regulations never applied to schools. However, under *the COSHH Regulations, The Management of Health & Safety at Work Regulations* and other regulations a risk assessment must be made for before any hazardous activity takes place and this would include storing chemicals. More recent concerns about making illicit substances such as narcotics or explosives have resulted in strong guidance to schools about the security of certain chemicals.	See CLEAPSS guidance leaflet GL108 *SYC - CLEAPSS advice.* The Home Office documents *Secure your Chemicals – Education, SYC - Secure your Chemicals - Assessment Tool* and the DfE document *Safe storage and disposal of hazardous materials and chemicals* are available as links from the CLEAPSS website, www.cleapss.org.uk.
Using chemicals classed as fatal	No national ban. Risk assessment needed.	Under the globally-harmonised system (GHS) of chemical labelling, implemented under the *Classification, labelling and packaging of substances & mixtures Regulations* (CLP), labels on a few chemicals are required to carry the signal word DANGER and one or more of the hazard statements: H300 *Fatal if swallowed*, H310 *Fatal in contact with skin*, H330 *Fatal if inhaled*, or H304 *May be fatal if swallowed & enters the airways.* These statements replace what we used to class as VERY TOXIC and are allocated on the basis of tests on laboratory animals (although alternatives to animal tests are being developed). For example H300 would be given to a chemical if 50% of a population of rats died when administered a dose of 50 mg or less per kg of rat. Whilst these statements can seem quite frightening they are simply indicating the type of hazard. They do not mean you will die if you look at them or use them. The risk depends on the quantity or concentration being used, the skills, training and experience of the user, the availability of suitable safety equipment, etc. The CLEAPSS risk assessment would be a judgement taking into account the likelihood of something going wrong, knowing the nature of schools and the type of activities taking place in them and the educational value of particular activities. See also the joint RSC/ASE/CLEAPSS/SSERC guidance *REACH and the teaching of practical chemistry* on all the partner web sites. Under the *COSHH Regulations*, employers must use the safest alternative which meets their objectives

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
Making explosives	Under the *Explosives Regulations* making certain explosives is completely banned. For other explosives, schools may make up to 0.5 g, providing there is a suitable and sufficient risk assessment and may make up to 100g if they have an Explosives Certificate issued by the police. Many activities which teachers/technicians would think of as explosions are not considered as such by the *Regulations* and so may be carried out by school if they have a risk assessment.	CLEAPSS can provide risk assessments; some are available on the CLEAPSS web site (eg, *Hazcards*, *Supplementary Risk Assessments*) but for Special Risk Assessments schools should apply directly to CLEAPSS. As long as the school has a suitable and sufficient risk assessment, the following activities can be carried out: • No gases are covered, hence there is no restriction on exploding hydrogen/oxygen, methane/air, custard powder/air, ethanol vapour/air ('Whoosh bottle'), etc. • If the mixture goes off instantly the components are mixed (ie you could not put it in a bottle for future use), there is also no restriction. So for example there is no restriction on reactions such as sodium/water, aluminium/bromine, $KMnO_4$/glycerine. In the same way, the 'Howling Jelly Baby' is not restricted because it reacts as soon as the jelly baby is dropped into the molten potassium chlorate. • If the activity is being carried out primarily for another purpose, and not for its pyrotechnic effects, the *Regulation* does not apply. Thus the thermit reaction is used to make molten iron for welding rails together and so is not restricted. However, there are problems about the mixture sometimes used to start the thermit. • Different exemptions apply to pyrotechnic articles, generally much higher limits than schools would ever need to use. So for example, 'fire writing' is exempt because the paper with words written on it using a concentrated solution of potassium nitrate is regard as a pyrotechnic article. Matches are also 'articles'.
Buying chemicals over the internet.	Even if there is no national ban on the chemical itself, experience shows that it may be improperly, or even illegally, packed, labelled and transported. It may have significant levels of possibly hazardous impurities.	Only buy chemicals from reputable schools suppliers. Even they sometimes supply chemicals of dubious purity or with doubtful packing but in that case you do have some redress.
Using 'spirit' burners	No national ban. Risk assessment needed. Small spirit burners are the preferred form of heating for microscale chemistry.	See CLEAPSS *Laboratory Handbook*, section 9.4.3, guidance leaflet GL157 *Make it guide: A spirit burner* and guide L195 *Safer chemicals, safer reactions*, section 5.
All use of solutions more concentrated than 0.4 mol dm^{-3} by pupils in Key Stage 3.	No national ban. Risk assessment needed.	See Guide L195 *Safer chemicals, safer reactions*, section 2 and individual CLEAPSS *Hazcards.*

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
Use of mercury and its compounds	No national ban on the use of mercury or its compounds, except for purchase of measuring instruments such as thermometers and barometers. Existing instruments can continue in use but a risk assessment is needed. Other uses of mercury and its compounds require a risk assessment. At the time of writing there is a consultation in progress which may result in some restrictions on supply. In general under the *REACH Regulations* there is a requirement for manufacturers and users of listed substances to be covered by an authorisation. However there is an exemption from authorisation for chemicals used in scientific research and development and in the UK educational use is normally covered under this category. See the joint RSC/ASE/CLEAPSS/SSERC guidance *REACH and the teaching of practical chemistry* on all the partner web sites.	Most uses will require a fume cupboard but re-circulatory filter fume cupboards are NOT suitable as the filters normally supplied to schools will not trap mercury. See CLEAPSS *Practical procedures* PX000/060 and 061 and *Hazcards* HC060 and 061.
Use of lead metal and lead compounds	No national ban. Risk assessment needed.	These may be of concern to those who are (or might be) pregnant. See CLEAPSS leaflet *PS013 Pregnant, new & breast-feeding mothers and school science*. See also CLEAPSS *Practical procedures* PX000/056, 057A and 057B and *Hazcards* HC056, 057A and 057B.
Use of nickel and its compounds	No national ban. Risk assessment needed.	Nickel(II) salts have recently been reclassified as Category 1 carcinogens. The CLEAPSS view is that Category 1 carcinogens present too high a level of risk for their continued use in schools to be justifiable in most circumstances. However, on application, we may be able to supply a Special Risk Assessment for some activities in A-level chemistry or equivalent. See CLEAPSS *Practical procedures* PX000/065B and *Hazcard* HC065B
Use of dichloromethane	No national ban. Risk assessment needed.	There do not appear to be satisfactory substitutes for some uses, especially in D&T, so adherence to the control measures is important. See CLEAPSS guide L195 *Safer chemicals, safer reactions* section 3, *Practical procedures* PX000/028 and *Hazcard* HC028. Also *Model Risk Assessments for D&T*, MRAT1.001 and 1.007.
Use of 1,1,1-trichloroethane ('trike' or methylchloroform)	Use for 'diffusive purposes' is banned under the *COSHH (Amendment) Regulations* which would include all plausible uses in school science. Note: this is **not** trichloroethene (trichloroethylene).	See CLEAPSS guide L195 *Safer chemicals, safer reactions* section 3 for alternatives or *Practical procedures* PX000/103 and *Hazcard* HC103A.

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
Use of methanol	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/040B and *Hazcard* HC040B.
Use of methanal (formaldehyde). As this is a gas at room temperature, it is normally supplied and used as a solution in water (formalin). [For use in preserving biological specimens, see *Mainly Biology*]	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/063 and *Hazcard* HC063.
Use of naphthalene (moth balls)	No national ban. Risk assessment needed.	See CLEAPSS guide L195 *Safer chemicals, safer reactions*, section 12, *Practical procedures* PX000/046 and *Hazcard* HC046B.
Use of benzene	This was banned nationally for many years under the *COSHH (Amendment) Regulations* but that has now been rescinded. Risk assessment needed. Some possible uses would be difficult to justify given that there are safer alternatives.	Safer alternatives exist for some purposes. See CLEAPSS *Practical procedures* PX000/46, *Hazcard* HC046 and guide L195 *Safer chemicals, safer reactions*, section 6.
Use of genuine crude oil	This was banned for many years under the *COSHH (Amendment) Regulations* because it contains more than 0.1% benzene. That has now been rescinded but it would be difficult to obtain and a risk assessment would be needed. Given that alternatives are available, it would be difficult to justify its use.	Genuine crude oil offers little advantage over 'synthetic' crude oil which has been widely used as an alternative: see CLEAPSS *Recipe Sheet* RB032 and guide L195 *Safer chemicals, safer reactions*, section 11.
Use of mineral fibres	Products containing asbestos are banned from sale under the *Control of Asbestos Regulations* but existing ones can continue in use if the fibres could not become air-borne. No national ban on other types of mineral fibre but some have significant hazards. Risk assessment needed.	Superwool 607, an alkaline earth silicate made by Morgan Thermal Ceramics and available from several school suppliers, does not carry any hazard warnings. See also CLEAPSS Guide L195 *Safer chemicals, safer reactions*, section 4 and *Laboratory Handbook* 9.11.3.
Using bromine in diffusion demonstrations	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/15A, *Hazcard* HC015A and guide L195 *Safer chemicals, safer reactions*, section 8.
Use of borax (disodium tetraborate-10-water)	No national ban. Risk assessment needed – the particular concern is over possible inhalation of dust or skin contact with more concentrated solutions.	See CLEAPSS *Practical procedures* PX000/014, *Hazcard* HC014A and *Recipe sheet* RB000/078. There is a discussion of the issues in CLEAPSS *Bulletin* 139 (Autumn 2010). See also *Making 'slime'*, below.
Making 'slime'.	No national ban. Risk assessment needed. It is possible that the use of boron compounds may eventually be banned under the *REACH Regulations* but this is some years away, if at all.	In the UK, cleaning products no longer contain borax/boric acid but these are still used in the USA. Borax/boric acid can be used for making slime, providing a suitable risk assessment is followed but an alternative method for primary schools is available. See CLEAPSS *Practical procedures* PX000/014, *Hazcard* HC014A, *Recipe sheet* RB000/078, or primary guide P042 *Slime time*. There is a discussion of the issues in CLEAPSS *Bulletin* 139 (Autumn 2010).

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
Use of plaster of Paris	No national ban. Risk assessment needed. Two serious accidents have occurred in **art** classes in which pupils' hands were badly burnt after becoming entrapped in large quantities of the plaster as it set.	See CLEAPSS leaflet PS 72 *Using plaster of Paris in schools*, *Practical procedures* PX000/019B and *Hazcard* HC019B.
Use of potassium (or ammonium) thiocyanate to test for iron(III)	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/095C and *Hazcard* HC095A (or *Practical procedures* PX009 *Hazcard* HC009B).
Using a blowpipe in lead oxide / charcoal reductions	No national ban but to be avoided (except in a fume cupboard) if pregnant or nursing females present. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/56, *Hazcard* HC056 and leaflet PS013 *Pregnant, new & breastfeeding mothers and school science.*
Electrolysis of sodium or copper chloride solutions in open laboratory.	No national ban. Risk assessment needed.	Electrolysis should be stopped as soon as the first trace of chlorine is detected. See CLEAPSS *Practical procedures* PX000/027A and 047 and *Hazcards* HC027A, 047B.
Electrolysis of molten lead(II) bromide and other lead salts	No national ban but to be avoided (except in a fume cupboard) if pregnant or nursing females present. Risk assessment needed.	See CLEAPSS guide L195 *Safer chemicals, safer reactions*, section 10, *Practical procedures* PX000/057A and 108A, *Hazcards* HC057A and 108A and leaflet PS013 *Pregnant, new & breastfeeding mothers and school science.*
Demonstrations involving fuming nitric acid	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX067 and *Hazcard* HC067.
Measuring rate of reaction of sodium thiosulfate with acid	No national ban. Risk assessment needed.	Take steps to minimise exposure to sulfur dioxide. See CLEAPSS guide L195 *Safer chemicals, safer reactions*, section 13, *Practical procedures* PX000/095C and *Hazcard* HC095A.
Using chromates and dichromates	No national ban. Risk assessment needed. In general under the *REACH Regulations* there is a requirement for manufacturers and users of listed substances to be covered by an authorisation. However there is an exemption from authorisation for chemicals used in scientific research and development and in the UK educational use is normally covered under this category. See the joint RSC/ASE/CLEAPSS/SSERC guidance *REACH and the teaching of practical chemistry* on all the partner web sites.	See CLEAPSS *Practical procedures* PP013, PP025, PP026 and PX000/78 and, *Hazcards* HC078A, HC078B, HC078C.
Demonstrating ammonium dichromate volcano	No national ban. Risk assessment needed. In general under the *REACH Regulations* there is a requirement for manufacturers and users of listed substances to be covered by an authorisation. However there is an exemption from authorisation for chemicals used in scientific research and development and in the UK educational use is normally covered under this category. See the joint RSC/ASE/CLEAPSS/SSERC guidance *REACH and the teaching of practical chemistry* on all the partner web sites.	See CLEAPSS *Practical procedures* PX007, *Hazcard* HC007 and guide L195 *Safer chemicals, safer reactions*, section 9.
Allegedly-banned chemical or activity	**Status of alleged ban**	**Guidance on healthy and safe practice and/or model risk**

		assessments
Heating iron / sulfur mixtures	No national ban. Risk assessment needed.	Take steps to minimise exposure to sulfur dioxide. See CLEAPSS *Practical procedures* PX000/055A and 096A, *Hazcards* HC055 and HC96A and guide L195 *Safer chemicals, safer reactions*, section 9.2.
Exploding cans of custard powder, icing sugar, lycopodium powder or similar	No national ban. Risk assessment needed.	See CLEAPSS *Supplementary Risk Assessments* SRA002.
Exploding cans containing methane / air mixtures	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/045A and *Hazcard* HC045A. See also CLEAPSS *Supplementary Risk Assessments* SRA003 and SRA012.
Demonstrating explosions of hydrogen / oxygen mixtures	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/48, *Hazcards* HC048 and HC069 and guide L195 *Safer chemicals, safer reactions*, section 7.1, 7.2.
Reducing heated copper(II) oxide with hydrogen	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX026 and PX000/048, *Hazcards* HC026 and HC048 and guide L195 *Safer chemicals, safer reactions*, section 7.3.
Demonstration of reaction of potassium with water	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX000/076 and *Hazcard* HC076.
Demonstration of reaction between sodium metal and chlorine	No national ban. Risk assessment needed.	See CLEAPSS guide L195 *Safer chemicals, safer reactions*, section 9, *Practical procedures* PX000/022A and 088, *Hazcard*s HC022A and 088.
Making black powder ('gunpowder')	Under the *Explosives Regulations* you must not make more than 0.5 g of black powder unless the school has an Explosives Certificate issued by the police. You must not make more than 100 g of black powder unless the school has a Licence issued by the Home Office. Risk assessment needed.	In the experience of CLEAPSS the demonstration of the properties of black powder is not satisfactory if no more than 0.5 g black powder is made. On application, CLEAPSS may be able to supply a Special Risk Assessment to those schools which have, or are applying for, an Explosives Certificate issued by the police, for making black powder (usually about 3 g).
Demonstrating the thermite reaction	No national ban. You must not use more than 0.5 g of some possible starter mixtures, unless the school has an Explosives Certificate issued by the police. Risk assessment needed.	See CLEAPSS *Practical procedures* PX001 and PX011, *Hazcards* HC001 and HC011, guide L195 *Safer chemicals, safer reactions*, section 9.4 and *Supplementary Risk Assessments* SRA 026.
Demonstration of 'howling jelly baby'	No national ban. Risk assessment needed.	Note that this should not be carried out in a room with a smoke alarm, in a filter fume cupboard or near flammable materials and does require good ventilation. See CLEAPSS *Supplementary Risk Assessments* SRA001.
Demonstrating the iodine / aluminium reaction	No national ban. Under the *Explosives Regulations* you must not make more than 0.5 g of the mixture, unless the school has an Explosives Certificate issued by the police. Risk assessment needed.	See CLEAPSS *Practical procedures* PX001 and PX054 and *Hazcards* HC001 and HC054.

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
Making sparklers	Under the *Explosives Regulations* you must not make more than 0.5 g of the mixture used in sparklers unless the school has an Explosives Certificate issued by the police.	In the experience of CLEAPSS this does not result in a satisfactory activity if no more than 0.5 g of the mixture is made and the HSE does not consider it safe on a larger scale.
Demonstrating reaction between propane-1,2,3-triol (glycerine) & potassium manganate(VII) (permanganate)	No national ban. Risk assessment needed.	See CLEAPSS *Practical procedures* PX037 and *Hazcard* HC037A.
Making nitrogen triiodide	No national ban. Under the *Explosives Regulations* you must not make more than 0.5 g of the mixture, unless the school has an Explosives Certificate issued by the police. Risk assessment needed.	See CLEAPSS *Supplementary Risk Assessment* SRA015.
Demonstrating potassium chlorate(V) / sugar reaction	No national ban. Under the *Explosives Regulations* you must not make more than 0.5 g of the mixture, unless the school has an Explosives Certificate issued by the police. Risk assessment needed.	See CLEAPSS *Hazcard* HC077. On application, CLEAPSS may be able to supply a Special Risk Assessment for making **no more** than 0.5 g.
Demonstrating reaction of magnesium with copper(II) oxide	No national ban. Under the *Explosives Regulations* you must not make more than 0.5 g of the mixture, unless the school has an Explosives Certificate issued by the police. Risk assessment needed.	See CLEAPSS *Practical procedures* PX026 and *Hazcards* HC026 and 059A.
Demonstrating reaction of zinc and sulfur	No national ban. Under the *Explosives Regulations* you must not make more than 0.5 g of the mixture, unless the school has an Explosives Certificate issued by the police. Risk assessment needed.	See CLEAPSS *Practical procedures* PX107 and *Hazcards* HC107 and 096A. The 'pocket rocket' demonstration would require an Explosives Certificate but CLEAPSS has been advised by the HSE that constraining the mixture is unsafe.
Demonstrating the reaction between magnesium and silver nitrate initiated by water	No national ban. Under the *Explosives Regulations* you must not make more than 0.5 g of the mixture, unless the school has an Explosives Certificate issued by the police. Risk assessment needed.	This demonstration has caused a number of very serious accidents. See CLEAPSS *Hazcards* HC059 and 087. On application, CLEAPSS may be able to supply a Special Risk Assessment for making **no more** than 0.5 g.
Demonstrating the reaction of potassium chlorate(V) with sulfur	This is illegal under paragraph 29(1)(a) of the *Explosives Regulations* without the prior approval of the Health & Safety Executive.	Don't even think about it.
Demonstrating the reaction of potassium chlorate(V) with phosphorus	This is illegal under paragraph 29(1)(b) of the *Explosives Regulations* without the prior approval of the Health & Safety Executive.	Don't even think about it.

Mainly physics		
Allegedly-banned chemical or activity	**Status of alleged ban**	**Guidance on healthy and safe practice and/or model risk assessments**
Use of model steam engines	No national ban. Risk assessment needed.	See CLEAPSS leaflet PS080 *How to use a model steam engine,* guides L214a *Examining autoclaves, pressure cookers and model steam engines: guidance for employers,* L214b *Examining autoclaves, pressure cookers and model steam engines: Written schemes of examination,* G214d PSSR exam *Mamod oscillating cylinder steam engines,* G214e PSSR exam *Wilesco non oscillating steam engines* and *Laboratory Handbook* 9.7.1.
Stretching metal wires and plastic filaments to breaking point	No national ban. Risk assessment needed.	See CLEAPSS guidance GL306 *Stretched wires etc.*
Use of air rifle in momentum demonstrations	No national ban. Risk assessment needed.	See CLEAPSS guidance GL370 *Using air rifles in science departments.*
Use of mercury in barometers, manometers, Charles' law apparatus, etc	There is a ban under the *REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) Regulations* 2006 (as amended) on the sale of all measuring instruments containing mercury to both the general public and professional users. Antiques are exempted, ie items more than 50 years old. Existing equipment can continue in use and you can construct your own equipment (see *Use of mercury metal* [below]). Risk assessment needed.	See CLEAPSS guidance GL242 *Make it guide – Charles' Law apparatus.*
Allegedly-banned chemical or activity	**Status of alleged ban**	**Guidance on healthy and safe practice and/or model risk assessments**
Use of stroboscopes	No national ban. Risk assessment needed.	See CLEAPSS guidance GL304 *Stroboscopes*.
Use of lycopodium powder	No national ban. Risk assessment needed.	See CLEAPSS *Supplementary Risk Assessment* SRA002.
Showing magnetic fields with iron filings	No national ban. Risk assessment needed.	See CLEAPSS guidance GL304 *Stroboscopes*.
Making pupils' hair stand on end with Van de Graaff generators	No national ban. Risk assessment needed.	See CLEAPSS leaflet GL190 *Using electrostatic generators - making sparks.*
Use of Wimshurst machines	No national ban. Risk assessment needed.	See CLEAPSS leaflet GL190 *Using electrostatic generators - making sparks*.
Use of EHT equipment up to 5000 volts at less than 5 mA	No national ban. Risk assessment needed.	See GL188 *Using EHT power supplies, GL189 - Using low tension and high tension power supplies,* PS076 *Electron beam tubes - an intro,* GL140 *Using semolina and an EHT to show electric field lines.*

Use of electron beam tubes, eg,Teltron tubes	No national ban. Risk assessment needed.	See CLEAPSS leaflets PS076 *Electron beam tubes - an introduction,* GL188 *Using EHT power supplies*
Demonstrating the power line at mains voltage on the transmission line	No national ban. Risk assessment needed. HSE has advised against certain types of apparatus.	Information about a safe commercial version can be found in CLEAPSS *Bulletin*128 (Spring 2007).
Demonstrations using sealed radioactive sources	No national ban. Risk assessment needed. Some limitations on the types of sources which can be used.	See CLEAPSS leaflet PS078 *Choosing new radioactive sources for school use: advice for science departments* and guide L93 *Managing ionising radiations and radioactive substances*.
Demonstrations using protactinium generators	No national ban in most of the UK; discouraged in Scotland. Risk assessment needed. Protactinium generators made in-house by the school are discouraged across the UK.	For half-life demonstrations the gas mantle radon generator is a safer alternative to protactinium generators made in-house by the school. See CLEAPSS leaflets GL128 *Measuring & demonstrating radioactive half-life*, *GL119 Making, storing, monitoring and using a protactinium generator* and guide L93 *Managing ionising radiations and radioactive substances*.
Demonstrations using thorium powder radon generators	No national ban but the CLEAPSS risk assessment concludes that they are no longer safe.	The gas mantle radon generator is a safer alternative. .See CLEAPSS leaflet GL128 *Measuring & demonstrating radioactive half-life* and video *Measuring the half-life of radon* and guide L93 *Managing ionising radiations and radioactive substances*.

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