

CLEAPSS guidance on Good Laboratory Practice with young people

It is expected that every university, research institute or school will have rules governing behaviour in the laboratory. No eating or drinking (or indeed smoking or the application of cosmetics) should be allowed in laboratories. Interference with mains services or equipment should be strictly forbidden, as should running or foolish behaviour generally.

Good hygiene is needed at all times, but especially when chemicals or living organisms are being used. Benches need to be wiped down after such activities and hands washed.

Suitable eye protection must be worn whenever the risk assessment requires it, ie, whenever there is a recognised risk to the eyes. This will certainly include activities in which chemicals are heated, heat is generated in a chemical reaction or any activities involving chemicals with a hazard classification. Eye protection is also necessary where there are mechanical hazards, eg when stretching wires to breaking point or evacuating vessels.

Many accidents occur during heating activities. Long hair should be tied back and ties, cardigans, scarves, baggy shirts, etc should not be allowed to hang freely. It is assumed that demonstrators (i.e. you) and teachers will show and remind students how to heat safely small quantities of solids in test tubes and liquids in boiling tubes (wide diameter test tubes), using small quantities so that the tube is not more than 1/5th full, and pointing the tube away from their own faces and other peoples' faces. The tube should be sloping so that the holder is not in a flame. For liquids, tubes should be gently shaken or a water bath used where appropriate. Students should stand, not sit, for most operations in which chemicals (and especially liquids) are handled.

Students need to be shown how to pour safely from bottles, pouring away from the label (so that it is not damaged by drips). Spills of chemicals should be wiped up at once. Some may require chemical treatment (eg, neutralisation) but, in the quantities normally handled by students, a damp cloth is usually sufficient. The cloth should then be rinsed. Students should be trained to use a spatula or similar device and never to handle chemicals with their fingers. Wherever possible, teat pipettes should be avoided. Even with well-behaved classes, too many accidents occur when liquids are squirted from them, eg, when clearing up at the end of a lesson. Except sometimes in the sixth form, work in schools rarely requires the use of protective gloves. However, when chemicals have been used or living organisms handled, students should be trained to wash their hands afterwards.

If the risk assessment requires the use of a fume cupboard, then this should meet the standard of *Building Bulletin 88, Fume Cupboards in Schools* (Architects and Buildings Branch, DfEE, 1998, HMSO) (previously *Design Note 29*).

If safety screens are required for a demonstration, then they should be sufficient in number to protect both the teacher and all the students. They should be sufficiently tall and sufficiently close to the apparatus to prevent objects going over the top. There should be a gap of 2 m or more between any demonstration and the students.

If microorganisms are in use, teachers unfamiliar with modern techniques may need training (see for example, *Topics in Safety, Safety in Science Education* or the *CLEAPSS Laboratory Handbook*). In any work in micro-biology, risks can be reduced to an acceptable level by observing good practice and following simple precautions. Sterile technique is needed to prevent cultures from becoming contaminated and to stop microorganisms escaping from cultures. This will involve ensuring that materials which will contact microbes are sterile before and afterwards; a pressure cooker or autoclave is essential, complemented by the use of appropriate chemical disinfectants to deal with spills and to clean working surfaces. By choosing appropriate organisms and growth media, avoiding the culture of microbes from dangerous sources and incubating at room temperature, together with the correct handling and sealing of cultures, exposure to pathogens can be minimised or eliminated. The culture of organisms that will be consumed, eg, yoghurt bacteria or baker's yeast, should not take place in a science laboratory.