



educationphotos.co.uk

Safety in the lab

GCSE key words

Risk assessment
Safety
Coursework

Practical chemistry experiments give you hands-on experience of chemicals and chemical apparatus. They are enjoyable, but every chemistry teacher can tell you stories of people who didn't follow the rules, and came to a nasty end. You need training in identifying, assessing and controlling risks if you want to keep yourself intact.

Health and safety laws about activities in school chemistry laboratories are intended to stop you getting hurt or hurting others. You are constantly supervised when you do activities in the chemistry lab, so relatively few accidents occur. But when they do they can be serious.

All your practical work in the laboratory should have had a **risk assessment** carried out on it before you start. The risk assessment will have spotted any hazards associated with a practical experiment and will have detailed safe ways to do the experiment.

Chemicals can be hazardous; most have at least one hazard. A substance may be toxic if you swallow or inhale enough (even sodium chloride – table salt), it may be flammable (it will catch fire if placed near a flame), or it may be corrosive (see Box 2). The risk assessment looks at the likelihood of an accident occurring under the conditions in which you are using

Box 1 Warning signs and labels



Prohibition signs are red and shaped like road signs. The symbol in the middle indicates what is prohibited



Eye protection must be worn in this area

Mandatory signs are circular signs with a white picture on a blue background. They give instructions that must be followed, e.g. eye protection must be worn



Warning signs are a black triangle on a yellow background and are used to warn of risks in science



First aid box

Safe condition signs are white on a green background and give information, e.g. the location of the first aid box, or fire exit routes

Box 2 Hazard symbols

Some chemicals have particular hazards associated with them. Orange labels warn of these

Oxidising



Explosive



Toxic



Flammable



Corrosive



Harmful



Dangerous to the environment



the chemical in the lab. As an example, keeping flammable solvents to small quantities and away from naked flames or very hot surfaces will reduce the risk of fire. There is still a risk of vapours igniting, but it is much smaller.



Right: Remember to wear safety glasses when using chemicals

Simple rules

The key to working safely is to follow the **safety rules** for the laboratory. Ask your teacher if you don't understand the instructions — don't guess or you could make a dangerous mistake. Tell your teacher if you think anything is dangerous, damaged or faulty.

Follow your **instructions** carefully. Always add chemicals in the order they are given in the recipe — it can make a big difference. For example, you must always add acid to water and not the other way round. Water added to acid gives out a lot of heat and the vapour formed may spray acid over you.

Keep to the **quantities** shown in the instructions. Scaling up the volumes of ingredients can also make a significant difference to the outcome of a reaction.

Mop up **chemical spills** quickly, using the right materials. There are special spill kits for dealing with particular chemicals, such as mercury. Teachers and technicians need to know about spills as soon as possible to prevent them spreading — it is quite hard to get chemicals out of shoes!

Be careful about **breakages**. Broken glass in the sink is hard to spot and people can — and do — cut themselves. Glass goes in a special glass bin for the safety of anyone dealing with waste.

Clean up thoroughly when you have finished an experiment. Don't leave traces of chemicals on the work surface — other people may unknowingly touch them and be harmed. Traces of acids and alkalis cause bad burns and damage your clothes.

Hazardous liquids or substances should never be put into unlabelled or wrongly labelled bottles. An unlabelled beaker of clear liquid *might* contain water

— but it could be sulphuric acid or ethanol. Don't leave unlabelled containers around on the lab bench. Ask your teacher before pouring chemicals away down the sink. If you do, then use plenty of water to dilute the chemical.

Wash your hands using soap and water every time you leave the laboratory. This is particularly important if you are just about to go for lunch — you don't want to eat your chemicals along with your food! Dry your hands using the towels or dryers provided. It makes sense to cover any open cuts on your hands before you start work.

First aid

Occasionally things go wrong and first aid is needed. All injuries, however slight, must be reported to your teacher. Schools have trained first aiders and some have qualified nurses. Specific chemical injuries require specialist treatment from someone who knows what to do.

If you have an accident it is important to reduce the amount of chemical in contact with your skin or eyes quickly. Chemical and heat burns, for example, should have 10 minutes under cold running water. There should be a green first aid box in every laboratory.

Protective clothing and equipment

Use the protective equipment and clothing required by the school. Safety glasses are a must when working with chemicals. Even rinsing a dropping pipette under a tap can cause splashes at eye level. It may feel strange or silly wearing protective clothing but you must follow this rule for your own well-being.

Fire

Take care when handling solvents and other flammable substances — keep them away from naked flames. Make sure that you know where the fire alarm button and fire exits are. Pay attention during fire drills so that you know *all* the routes out of every lab you are taught in. Avoid using volatile hair products — they have been known to ignite when too close to a Bunsen burner.

Finally

Remember these four important rules:

- **Learn** how to work safely.
- **Obey** safety rules.
- **Ask** your teacher if you don't understand any instructions.
- **Report** to your teacher anything that seems dangerous, damaged or faulty.

Dr Keith Bowker is Director of Health and Safety at Oxford University and a partner in Oxford Safety and Risk Management, a leading UK health and safety consultancy specialising in the school sector.

Don't eat, chew gum or drink in a laboratory — you may ingest harmful chemical traces.