

# Welcome to the Wonderful World of Waste and the School Laboratory

## Part VII

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This quarters' article will mention a few of our favourite chemicals, as well as gas cylinders, which will lead us into types of fire extinguishers.

What makes a chemical a favourite? A number of things. Can it be reused or recycled? These are not the same thing; reuse is for immediate use as is, recycle may require repacking, filtering or some other clean-up step. Is it a non-dangerous good or non-hazardous substance? Again, these are not the same thing. Dangerous goods represent an immediate danger, ie. explosive, toxic, flammable, etc., while 'hazardous' is a term used in the GHS system of classifying chemical substances for potential harm when being exposed to them during use. Dangerous goods present an immediate danger and are an acute and immediate hazard. Hazardous substances usually present a chronic hazard over a period of time, not necessarily immediate. There is plenty of overlap between the two systems, but keep in mind that the dangerous goods classification (with coloured diamonds, UN numbers, segregation and storage rules) is primarily for transport and storage. Hazardous substance classification applies when you wish to actually use them, such as weighing it out, dissolving, mixing, etc. The much-maligned Safety Data Sheet (SDS) is supposed to tell potential users whether a substance is hazardous and why, according to the criteria of Safe Work Australia. It should also contain any dangerous goods information, usually under the transport section of the SDS.

So, a laboratory chemical is neither a dangerous good nor a hazardous substance and can be reused, so it is an immediate favourite. Examples would be sodium carbonate anhydrous (soda ash) which you can use to deodorise your acids cabinet and fridge and use as an acid neutraliser. Sodium bicarbonate has the same potential uses. Citric acid is good to neutralise ammonia solutions. Kieselguhr or Fuller's earth is a good absorbent. Alumina or aluminium hydroxide are excellent inert powders to dilute solid metal powders such as aluminium powder or zinc powder. It is the same with magnesium oxide, although it is a bit light. Ammonium sulphate is good for the lawn too, as is urea. We never throw any of these chemicals away and suggest that you hang onto them in your lab too.

Some dangerous goods can be favourites, such as those that can be used as plant fertilisers – calcium, ammonium and potassium nitrate, for example. Silver nitrate will always be recovered for silver, as will any precious metal salt or solution

Lead, tin, nickel, zinc granules (not the dust) and copper are always recycled. Not so with sodium, potassium, calcium, barium or strontium as elements. We have never had any request or cause to recycle or reuse any of these dodgy alkaline earth metals.

Gas cylinders are dangerous goods class 2 and are fairly rare in the school laboratory these days. The quality that makes them dangerous is the very high pressure of gas in a cylinder. The pressure in a typical car tyre is around 30 pounds per square inch (psi). A cylinder of compressed air may be as high as 30,000 psi. That's a lot of energy stored in a cylinder. Don't forget that BBQ gas bottles are under high pressure as well as being a flammable gas. If you intend on using a gas cylinder in the school laboratory, you must address storage and handling, even if it is just a small gas cylinder of LPG for a Bunsen burner.

This brings us to fire extinguishers. You should be familiar with the colour coding system of fire extinguishers. They are all red with various coloured stripes. A blue stripe indicates that it is a foam extinguisher, white is a dry powder, black is carbon dioxide and no stripe is plain, low pressure water. They all have specific uses but I won't go into these here. Suffice to say, the best all-rounder is probably the dry powder extinguisher. The carbon dioxide extinguisher is an actual gas cylinder with CO<sub>2</sub> under high pressure. You will only get about 20 seconds of gas from a CO<sub>2</sub> extinguisher but, as it comes out under pressure, it is sufficient to extinguish most fires. Solid CO<sub>2</sub> (ie. dry ice) holds a temperature around -40°C, so you don't want to spray any exposed skin with a CO<sub>2</sub> extinguisher. The other cylinders are just above normal air pressure and so present no freezing hazards.

It is also incumbent to have your fire extinguishers serviced regularly, usually every 6 months. The last thing you want is to reach for your extinguisher to put out a small fire at school and nothing happens because the extinguisher has expired. *Très embarrassment!*

An update on the EPA electronic transport certificates. These have been required for every disposer since 1 July this year and most schools have managed to work them out. We will help you do the certificate when we are collecting your chemicals, but the school must register on the EPA portal. Most of the problems with the certificates is that the computer you use to log on must have Microsoft Internet Explorer and at least Acrobat version 7 or better. These are not commonly used, but the entire thing won't work with other browsers. We are hoping EPA will visit the 21st century soon and recognise that not many people actually use Internet Explorer. Anyone heard of Apple? As a last resort, we can produce an accredited agent certificate for you if you have genuine trouble completing a transport certificate, but we encourage you to get registered. It won't hurt and you should talk to your colleagues at other schools. We are trying to have an online demonstration to show at the upcoming LABCON in November, but our preferred laptop which holds the presentations is an Apple.