Waste disposal

Avoid waste

If you carry out a practical activity in a school or college you may end up with waste. Waste is anything you don't want. The best way of dealing with waste is not to create it in the first place. Take care not to contaminate a large stock bottle, for example, by putting a dirty spatula or teat pipette into it. Plan the activity so as to minimise the amount of waste you need to deal with. If there are two alternative methods, which one generates the least waste? Microscale chemistry uses much smaller quantities than traditional methods, so generates much less waste.

Waste disposal in general

Waste disposal is tightly, and expensively, regulated. Legislation distinguishes between many different categories of waste. This sheet refers mainly to the waste that might be generated in student practical work.

Recycle or re-use

Before disposing of waste, consider whether it can be recycled or re-used. Can the product you have made in this chemical reaction, eg copper sulfate, be used for some further purpose? Can an impure solvent be re-distilled, safely, to purify it?

Solids, including solid non-hazardous chemicals

Solids which are not hazardous, and not separately classified, including non-hazardous solid chemicals, eg calcium carbonate, can be placed in the solid refuse collection. You have a duty of care to those handling the waste later on, so, for example, broken glass (if there is no separate glass collection) should be wrapped and labelled to minimise the risk of injury.

Water-soluble chemicals

If a chemical dissolves in water, and is not classed as hazardous, eg sodium chloride, it can be dissolved in water and poured down the drain as effluent. Small amounts of some hazardous chemicals can be disposed of in the same way, providing the concentration is below a threshold – the limit depends on the nature of the hazard. For some chemicals, eg copper sulfate, a 10% solution is OK (ie, not more than 10 g of the chemical in 100 cm^3 of the solution), but for others, eg potassium dichromate, the maximum concentration is 0.1% and some are completely prohibited, eg mercury compounds. It is considered prudent to react acids or alkalis so that the effluent is roughly neutral. Similarly, react oxidising agents with reducing agents before flushing away.

Hazardous solid chemicals

Hazardous chemicals which do not dissolve in water, eg lead oxide, or which do dissolve but are too hazardous to dispose of in this way, eg many pesticides, must be collected by a Licensed Waste Carrier for safe processing.

Non-aqueous liquid chemicals

Chemicals which are liquids which do not mix with water, eg paraffin or solvents for cleaning paint brushes, must be collected by a Licensed Waste Carrier for safe processing. Cooking oil, even although it is not regarded as hazardous, must **not** go down the drain because it can result in fatbergs which block sewers.

Biological waste

Much biological waste (ie, plant materials) can be treated as solid waste, although ideally it should be composted. Left-overs from dissections must NOT enter the food waste system. It should be wrapped in newspaper and placed in the main non-recyclable waste.

Microbiological waste

Microbiological waste needs to be sterilized before disposal, usually by autoclaving. Very occasionally suitable disinfectants may also be acceptable.

Gases

Discharging gases to the atmosphere is regarded as pollution but small amounts of most gases can be discharged from fume cupboards to the atmosphere as long as they are not in quantities which would allow them to become a risk or a nuisance (eg, causing an unpleasant smell) to neighbours.

Cells and batteries

Dead cells and batteries of all types must not be disposed of as solid waste. Collection points can be found at civic amenity sites and at shops selling batteries. May have the 'do not discard' symbol (right).

Waste electrical and electronic equipment

No electrical and electronic equipment - from vacuum cleaners to light bulbs, from mobile phones to ammeters - can be disposed of as solid waste but must be collected separately, either by licensed waste carriers (for businesses, including schools) or taken to a civic amenity site (usually only domestic users). Modern items should have the 'do not discard' symbol (right).

Radioactive substances

Some low-level radioactive materials can be disposed of as solid waste or effluent, as above, but legislation is very detailed and a licensed waste carrier is usually needed.

