

Topic 11: Disposal of waste and unwanted materials

This Topic (dated 2015) is a revised version of Topic 11, which appeared in the 3rd edition of *Topics in Safety* (ASE, 2001). The changes in legislation on waste since then are considerable, and some of the disposal routes have changed since the 3rd edition.

11.1 Introduction

Managing waste and unwanted materials is not restricted to the science department. Other areas of the school produce waste, including hazardous waste, and the science department must follow the school procedures. If you dispose of waste, you have a legal duty of care to make sure it is managed safely and disposed of lawfully. You can't just pass the waste on to someone else and let them get on with it - you need to take reasonable steps to check your waste will be managed correctly. The disposal of waste is regulated by UK laws which are based on the EU Waste Framework Directive. The laws regulate the collection, transport and final disposal of waste. The implementation of the EU framework varies a little across the different countries of the UK so it is important to understand the legal requirements that relate to the country your school is in. Secondly, the EU directives are revised periodically so it is also important to get up-to-date advice when you dispose of waste. CLEAPSS (for England, Wales & NI) and SSERC (for Scotland) provide up-to-date guidance for their members.

The law classifies disposal routes for different types of waste. The following sections explain these routes and you need to make sure you choose the correct one(s) for your waste. Avoid mixing wastes that have different disposal routes. For example, do not add hazardous chemical waste to inert waste; it could make the overall disposal much more expensive. Do not allow waste to accumulate into large amounts; arrange for disposal at reasonable intervals. Make sure the waste is labelled as such so that it cannot inadvertently go back into use at your school. The label should also clearly identify what the waste is (unless it's obvious). Store the waste safely and, if it is harmful to the environment, store it so that it is unlikely to escape.

11.2 Minimising waste

It is often expensive to dispose of materials that are harmful to people or the environment, so it makes sense to consider disposal costs when acquiring new equipment, chemicals or other materials. Avoid overstocking chemicals - schools sometimes overlook this when a good bargain seems to be on offer, for example a discount on bulk purchase of chemicals, or a donation of materials from industry. If the materials degrade before they are used, the department then has a large amount of material to dispose of, possibly costing more than the original saving.

For practical activities that produce waste, consider reducing the scale of the activity by using small quantities, eg microscale chemistry, or an equally-effective activity that does not produce hazardous waste.

11.3 Recycling

If the material or equipment is in good usable condition, then you can give it to another organisation that can make use of it, eg another school. You still have a duty of care regarding the unwanted material or equipment – do not give it away unless you are confident it is correctly labelled and in good condition. If you are giving materials to someone else, make sure they are suitably responsible to accept, manage and use correctly the recycled equipment or materials.

11.4 Chemical waste

When disposing of chemical waste, you should refer to the specific information on disposal from CLEAPSS *Hazcards* or SSERC *Hazardous Chemicals Database*. The supplier's data sheet may also be useful.

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There are three principal disposal routes. Chemical waste can be disposed of as:

- inert waste if the waste is solid and not classed as hazardous (special) waste;
- effluent if it is an aqueous solution (but there are restrictions); and
- hazardous waste, called special waste in Scotland.

Inert chemical waste can be disposed of with normal refuse. For hazardous waste, see section 11.5. The following subsections provide additional notes.

11.4.1 Water-soluble wastes

With a few exceptions (see the next paragraph) most water-soluble wastes from science departments can be dissolved in water and then disposed of as effluent down the mains sewer (foul drain). The effluent must go directly into the main sewer, not into a septic tank. The quantities dissolved should not be large, typically no more than a few grams of solute at a time, and the effluent flushed away with plenty of water so the concentration is very low. In some cases, the solution will need treatment before disposing of it down the drains, for example acids and alkalis should be roughly neutralised, and oxidisers should be 'neutralised' with reducing agents.

Do not confuse sewerage drains with rainwater drains. Laboratory waste must never be allowed to get into rainwater drains.

11.4.2 Liquids that should not be disposed of as effluent

You are not permitted to dispose of liquids, as effluent, that are immiscible with water, or pose a flammability risk, or that could cause a build-up of fumes or dangerous gases in the confines of a sewer. There are also other liquids that should also not be disposed of down the sewer, for example solutions that are very hazardous to the environment, such as those that bio-accumulate or are very slow to degrade, and those that could harm the sewerage system and the people who work to maintain it.

There are lists of specific restricted wastes from commercial or industrial premises that must not be disposed of down the sewer without consent from the sewerage company or the environmental regulator. While sewerage from schools is normally classed as domestic, and domestic effluent into the main sewer is not normally subject to discharge consents by the sewerage company, do not put these restricted substances into the sewer because they may affect the treatment and final disposal of the sewerage (which is illegal).

The specific restricted wastes likely to be relevant to schools are:

- organohalogen compounds and substances which may form such compounds in the aquatic environment;
- mercury and its compounds;
- cadmium and its compounds;
- petroleum spirit, persistent mineral oils and hydrocarbons of petroleum origin, and
- persistent synthetic substances which may float, remain in suspension or sink and which interfere with any use of the water.

Dispose of these as hazardous waste (see 11.5). Many insecticides and biocides appear on restricted lists, it is best not to dispose of any of these down the sewer.

11.4.3 Other points to consider regarding chemical waste

- Be careful about mixing redundant stocks of waste chemicals together. You can combine small quantities of waste chemicals from practical activities where the wastes are compatible, but do not mix incompatible chemicals (i.e. those which could cause an undesired reaction, such as producing fumes, or causing a fire, or creating an environmental danger).

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- Keep aqueous and organic waste separate, and halogenated and non-halogenated solvents separate.
- Keep a record of the chemicals that have been added to the same container.
- Highly flammable waste should be stored in a fire-resistant cabinet.
- Do not use a fume cupboard as a chemical waste store.

Containers of unknown chemicals are problematic. You cannot legally dispose of waste material unless you know what it is. If you don't know what the waste is, your school faces expense and inconvenience because you may need to use a specialist contractor to analyse, identify and characterise the waste for disposal, along with any costs for repackaging it for disposal. There have been cases of redundant chemicals placed in a store to avoid the costs of disposal, and years later the waste is discovered with the labelling or condition degraded so that it has become unidentifiable or in a dangerous condition. The disposal cost is likely to be much greater than it was originally, and it often takes considerable time to sort out. Leaving waste indefinitely just to avoid costs of disposal is poor practice and could be considered negligent if something went wrong. You can store hazardous waste for up to 12 months (although the regulator would be unlikely to bring enforcement should the department store it for longer provided that this was justified, the quantities were relatively small, the waste was stored carefully, and the science department can show a well-considered management of waste and disposal programme).

11.5 Hazardous wastes (called special wastes in Scotland)

Disposal of materials that are hazardous to the environment is regulated by the *Hazardous Waste Regulations* (*Special Wastes Regulations* in Scotland). Hazardous wastes must be disposed of by a registered waste carrier who removes the waste to an appropriately-permitted disposal site. You must check the waste carrier you use is registered. (This legislation does not apply to many water-soluble chemicals, which can be disposed as effluent, see section 11.4.)

A hazardous waste is one that is listed in the *European Wastes Catalogue*¹ (EWC); the definition of hazardous waste depends both on the hazards of the material and the industry or process from which it arises. There are some wastes that are termed 'absolute'; they are always classed as hazardous waste. But there are other wastes termed 'mirror entries' where concentration levels apply, below which the waste is not classed as hazardous and can be disposed of as inert material. However, you may not deliberately dilute a hazardous material to reduce the concentration to achieve this. The full details of the concentration levels that apply are in the environment regulator's Technical Guidance WM2, *Hazardous waste: Interpretation of the definition and classification of hazardous waste*². But as the document title implies, this is technical guidance and not a 'layman's guide' and schools are better advised to use the CLEAPSS or SSERC guidance.

Most hazardous (or special) wastes from schools do not come from the science department, other than in exceptional circumstances, for example a chemical store clearance. The bulk will come from waste such as old fluorescent tubes, cleaning materials, paints and similar materials from school maintenance. Waste producers in England and Wales must register with the environmental regulator in advance. However, organisations are exempt from registration provided that they produce less than 500 kg of hazardous waste per year. It would not be for the science department to register, but for the school. Hazardous (special) waste producers in Scotland or Northern Ireland are not required to register.

¹ This is updated periodically and classifications can change.

² WM3 is expected in 2015.

For removal of hazardous waste, the waste contractor has to complete a consignment note that describes the hazardous waste correctly. You also have a responsibility to complete parts of the consignment note. You must keep a copy of the consignment note for at least three years after the waste is taken away; the consignment note should have the waste carrier's details. You should also receive a return from the final waste site confirming the disposal of your waste, which you should also keep. It is important to keep these records.

11.6 Asbestos

Asbestos is carcinogenic and classed as hazardous waste. For many years now, all forms of asbestos have been prohibited in new products. However, asbestos that is sealed and kept in good condition does not need to be disposed of. Asbestos in the fabric of the building is usually managed this way. (Note that the management of asbestos that is in the fabric of the building is a whole-school matter.)

It is possible that old science equipment may contain asbestos, such as old radiant heater bases, old heat-resistant mats, asbestos gauzes, asbestos wool, and platinised asbestos. None has been available for decades, and heat-resistant mats currently used in schools are unlikely to contain asbestos. But if you suspect you have equipment containing asbestos, and fibres could foreseeably be released, arrange for its disposal. The person disposing of it must do it in a safe manner, not exposing themselves or others to asbestos fibres. The asbestos should be double-bagged, taped securely, and disposed of as hazardous waste (special waste) using a registered waste carrier who takes it to a disposal site permitted for asbestos waste. Asbestos must not be reused or recycled.

11.7 Waste Electrical and Electronic Equipment (WEEE)

Again, this applies to all the school. Your school is likely to have an arrangement with a waste contractor or local authority for the disposal of WEEE. Find out the arrangements at your school. Electrical and electronic equipment is a wide category, including refrigerators, meters, data-loggers, electrical vacuum pumps, etc. Since 2007, any electrical and electronic equipment producer ('producer' includes manufacturers, those who re-brand, or those who import) has to finance the costs of collection and treatment of waste produced when the equipment reaches the end of its useful life. However, the arrangements differ for households and non-households such as businesses and schools. Don't dispose of waste electrical and electronic equipment in the normal refuse. Your civic amenity site may accept such waste. Fluorescent tubes are hazardous waste, as are many specialist lamps which have hazardous materials in them such as mercury and sodium lamps; they are not classified as WEEE.

11.8 Waste lamps

Tungsten lamps, including halogen lamps, can be disposed of as normal waste. LED lamps usually have integral electronic components and are therefore classed as WEEE. Lamps that contain hazardous materials such as fluorescent tubes, compact fluorescent lamps, sodium lamps and mercury discharge tubes are hazardous waste, not WEEE. For other lamps, refer to the supplier's data to check if there are hazardous materials in the lamp, and dispose of them accordingly.

11.9 Waste batteries

Supermarkets and other battery retailers have recycling points in their stores for small consumer batteries such as AA, AAA and button-size batteries. Don't accumulate hundreds of batteries before disposing of them; take them in small batches to a recycling point when they become waste. Some schools have battery-recycling points.

For lead-acid batteries, your local civic amenity centre may accept them. Tape the battery terminals to prevent short circuits, and be careful in transporting them; keep the battery upright to avoid acid leakage. Transport the battery in a tough plastic container or similar to retain any acid should it leak.

11.10 Animal products waste

There has been a change in the legislation so that disposal is no longer overly-restrictive. Small amounts of dissection waste, such as hearts, eyes and rats, can be disposed of with normal refuse. We advise you “double-bag” it - that is you wrap the waste in a sturdy opaque plastic bag and then in a second opaque bag - tie off the bags securely, then put it into the main refuse shortly before it is collected by the waste contractor. This avoids the waste decomposing and attracting vermin. Keep the bagged waste in a freezer or fridge until you dispose of it into the main refuse container. Put a temporary label on the bag so it doesn't become reused inadvertently and remove the temporary label just before disposal.

11.11 Sharps

Wrap glass in thick newspaper, tape it and bag it and put it directly into the main school refuse collection containers. Do not put it into the clinical waste or sharps box unless it is contaminated with clinical waste. Lancets and other sharps contaminated with blood or other body fluids should be placed in a sturdy yellow-labelled container designed for clinical waste sharps. If possible, dispose of the sharps box by the same arrangements for disposal of clinical waste from the school first-aid room. If this is not possible, you will need to arrange disposal by a registered waste carrier who removes the waste to an appropriately-permitted disposal site.

11.12 Radioactive waste

Disposal of radioactive waste will be covered in the revised Topic 19.