

# 16 Steps to Minimize Chemical Disposal

## Smart, Inexpensive Practices to Reduce Hazardous Waste

The single largest chemical problem facing most academic institutions today is chemical disposal. Purchasing chemicals in large package sizes, poor chemical inventory management, faculty and staff turnover, and changes in the curriculum are just a few of the many reasons why your school may have a chemical disposal problem. Every school, college and university needs a plan to minimize future laboratory chemical/disposal issues. Chemical disposal is a necessary part of any chemical laboratory activity. The following 16 steps will help reduce the amount of chemicals that need to be disposed and make the disposal process easier to manage.

### 1. Maintain an up-to-date inventory of your chemicals.

Maintaining a good chemical inventory will eliminate buying excess or unneeded chemicals.

### 2. Purchase chemicals carefully.

Careful purchasing is the first step in decreasing the amount of unwanted chemicals and subsequent chemical disposal. To reduce unwanted chemicals, purchase smaller size packages of chemicals, only what is needed for the next 1 to 3 years, and only from chemical suppliers that will guarantee fresh chemicals. If you only need a dilute solution of a chemical, buy the solution and not a large bottle of the solid. Buying chemicals in bulk to save a few dollars ends up costing more in the long term. Disposal of unused chemicals will always cost more than any cost savings from larger sized packages.

### 3. Date label your chemicals and only buy from chemical supply companies that date label their chemicals.

Chemicals age at different rates and knowing the age of your chemicals may help determine if they are still usable.

### 4. Use older chemicals first, before they decompose.

This requires date-labeling of chemicals.

### 5. Provide good climate control for the chemical storeroom.

Store chemicals in a cool, dry environment. Heat and humidity quickly degrade chemicals resulting in materials that are unsuitable for laboratory use and requiring disposal. This is particularly important during the summer months when many schools may turn off their air conditioning.

### 6. Ventilate your storeroom.

Providing a continuous air exchange in your storeroom is not only safer for you, but will provide a better environment for storage of chemicals.

### 7. Label all chemicals and laboratory solutions.

Any unlabeled bottle becomes a chemical disposal nightmare; first the chemical must be identified, then it must be disposed. To avoid unknown and unwanted solutions, replace or repair old labels and immediately label all prepared solutions.

### 8. Prepare only enough solution for immediate use.

Preparing extra solution for storage frequently results in many bottles of unwanted solutions that ultimately require disposal.

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## ***Be proactive... Reduce chemical waste starting today.***

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### 9. Never store chemicals or solutions in "homemade" bottles.

Storing solutions in containers not designed for chemical storage leads to a shorter shelf life of the laboratory chemical. "Homemade" bottles may not provide suitable protection from the environment or may not be compatible with the chemical. Using proper chemical containers will provide safer storage and allow for longer storage of chemical solutions.

### 10. Store hygroscopic and deliquescent chemicals in Chem-Saf® bags.

Make sure the caps are on tight and use Parafilm M® around the cap for extra protection. Chem-Saf® bags and tight caps help keep moisture out of containers and greatly increases the shelf life of chemicals.

### 11. Follow good laboratory practices.

Never allow students to place chemicals back into a chemical reagent bottle. Contamination from student use will dramatically reduce purity and the shelf life of a chemical. To enforce this practice, place smaller amounts of chemicals in beakers or bottles for dispensing.

### 12. Microscale your labs.

Microscale laboratory procedures can reduce your wastes a hundredfold. Many times, the quantities produced in a microscale lab can be disposed of down the drain. If you microscale your labs, also microscale the quantity of chemicals you purchase (see #2).

### 13. Purchase chemical demonstration kits or student laboratory kits that contain exact quantities of chemicals.

This eliminates storage and disposal of "extra" chemicals. Flinn chemical demonstration kits contain enough chemicals to present the demonstration seven times. At the end of the day, there are no unused or unwanted chemicals.

### 14. Look at disposal procedures first.

When choosing a lab or demonstration, look at the disposal procedure first. If the disposal procedure is difficult, consider microscale techniques or substituting less hazardous materials. Avoid the use of heavy metals whenever possible.

### 15. Neutralize, reduce byproducts, and dispose of chemicals immediately after they are generated.

Do not stockpile unwanted byproducts or other laboratory wastes from chemical reactions or experiments. Treat chemical byproducts or leftover solutions as part of the experimental procedure. This is safer and easier than stockpiling chemicals for a massive disposal at the end of the year.

### 16. Identify hazardous waste and keep waste solutions separate.

Never mix leftover chemicals or byproducts from different labs unless the materials have identical disposal methods and are chemically compatible. Adding a small amount of a lead compound to a waste bottle necessitates licensed hazardous waste disposal of the entire contents due to heavy metal contamination.

Implementing and following these 16 steps to minimize chemical waste will save money and improve the overall safety profile of your school.