

ARE YOUR SCHOOLS' ART AND SCIENCE LABS CHEMICALLY SAFE?

So, just how safe are your schools' science and art rooms? When performing school inspections in the science or art rooms, there are several issues to consider when you are inspecting your schools. Many of those key issues involve the proper chemical storage and use as well as ensuring that the Material Safety Data Sheets (MSDSs) are in the area where the chemicals are stored. While OSHA and the EPA govern how to properly store, use, and dispose of chemicals, it is important to realize that good management practices are needed to ensure that students are not harmed by them. The best way to ensure that our children will be safe is to ask a series of questions.

1. Are these chemicals stored properly?
2. Are there Material Safety Data Sheets easily accessible?
3. Are flammable chemicals stored in a proper flammable storage cabinet?
4. Are the flammable storage cabinets stored away from any heat source?
5. Are chemicals that are incompatible with each other stored in separate areas?
6. Are acids (pH 7 and lower) stored separately from bases (pH 7 and higher)?
7. Are acids being stored in a proper acid storage cabinet?
8. Are bases being stored in a proper base storage cabinet?
9. Are the storage cabinets locked when not in use?
10. Are students' exposure to chemicals eliminated?
11. Are the ventilation systems operating properly to ensure that the students are not subject to any unnecessary chemical exposure?
12. Are the safety showers and eye wash stations working properly?

These are just a few questions that need to be determined when inspecting our schools' art and science classrooms. Now, let's review some items to be looking for while inspecting chemical storage in our schools.

Material Safety Data Sheets

Check to see that each chemical has a Material Safety Data Sheet in the area. It is mandated that each chemical has their own MSDS that is easily accessible whether it is located in the science lab, art room, or a chemical storage room. The MSDS outlines important safety information such as how to properly handle and store chemicals properly, how to clean up chemical spills, and the general characteristics of chemicals including the boiling point, flashpoint, and other important information. MSDSs are a requirement by the Department of Labor (OSHA).

It is also important to remember that the personnel handling the chemicals are to be trained on how to read and apply the MSDS in their daily work lives.

SAFE STORAGE PRACTICES OF CHEMICALS

The safe storage of chemicals used in laboratories and art rooms is perhaps one of the most important of all chemical safety issues.

For solvents and other flammables, the following safety rules must be applied. First, they must be properly stored in a cabinet approved for flammable substances. Second, only the amount of flammable chemicals that is needed should be in storage. Lastly, the proper storage equipment for this classification of chemicals is a metal safety can for amounts of one gallon or less; and a double-walled cabinet approved by the National Fire Prevention Association for amounts of more than one gallon.

Acids and bases must be stored separately from one another because they are both corrosive and can readily react with each other. These reactions can become violent in nature. They must be stored in separate cabinets. When these chemicals are not segregated, they will often have a white crust of ammonium salts on the container, which is formed by the fumes of Ammonium Hydroxide with acid fumes.

Another classification of chemicals to watch for are those which pose an acute or chronic toxicity hazard. These particular substances include Sodium Cyanide or Ammonium Molybdate.

The non-hazardous chemicals, which pose no health risk can be stored in a lockable general storage cabinet.

If the MSDSs are located in the laboratory, they must be stored in a separate cabinet.

Listed below are the different classifications of chemicals that must be store separately. Depending on the amount, and type of chemicals present in the science lab or art room, there may need to be five separate storage areas.

1. Sulfuric and Nitric acids
2. Other Corrosive acids such as Hydrochloric, Acetic, and Formic
3. Corrosive bases: Ammonium Hydroxide, Sodium Hydroxide, and Potassium Hydroxide
4. Flammables (must be stored in a flammable storage cabinet)
5. General storage is permitted for separation of certain chemicals depending on the hazards of the chemicals.

COMPRESSED GASES

All pressurized cylinders must be fastened to an immovable object such as a wall, workbench, or table by using a heavy strap or chain.

VENTILATION SYSTEMS

The ventilation system must be in operation any time a chemical is used that has the potential to cause a dermal or an inhalation hazard.

LABELING OF CHEMICALS

The labeling of the chemicals must follow all federal or state regulations. The following items must be on a label:

1. Common name of the chemical
2. Common synonyms
3. Toxicity information
4. Any other hazards (eg. Fire triangle, oxidizer, flammable, toxic, or several others).
5. Manufacturer information and address

6. Additional information such as the date acquired and storage information (eg. Shelf and cabinet location)

Remember all labels must be legible, otherwise it is in violation of the law. Also, any secondary containers used to hold these chemicals must be labeled with the same information as the original container.

CONTAINER INTEGRITY

Containers which hold chemicals are to be received in a condition free of cracks or chipped lids; chipped threads on the bottle necks; and corrosion of metal containers, otherwise they should be disposed of immediately.

EMPLOYEE TRAINING

Employees also need to be trained on how to use chemicals safely. As for high school chemistry and art rooms, students must be given a short training session on how to safely handle the chemicals that they will be working with.

With these guidelines, the chemical safety of our schools and public buildings can be assured. Training on how to safely store, handle, and dispose of chemicals is the key to having a chemical safe school.

For further information on these issues, the following Web sites and/or books will prove to be helpful.

1. <http://chemistry.uneche.maine.edu/Safety/Storage.html>
2. <http://www.flinnsci.com/homepage/safe/chemstor.html>
3. D.A. Pipitone, Safe Storage of Laboratory chemicals, John Wiley and Sons, New York, 1984
4. J.A. Young, Improving Safety in the Chemical Laboratory, Wiley, New York
5. <http://www.chemistry.uneche.maine.edu/Safety/Storage.html>
6. <http://www.flinnsci.com/homepage/safe/chemstor.html>