Lourdes School of Mandaluyong
High School Department
Science & Technology Area

CHEMICAL WASTE DISPOSAL PROGRAM

RATIONALE:

The proper disposal of chemical waste is imperative in science laboratories to secure the safety of laboratory users, protect the environment, and comply with the existing government regulations. Chemicals that are not disposed of properly can have harmful effects on people and the environment. Therefore, having a program for proper waste disposal is essential for maintaining a safe and healthy working environment. A program for the proper disposal of chemical wastes typically involves guidelines and procedures for handling, storing, and disposing of different types of chemicals. This includes identifying hazardous chemicals, labeling them properly, and storing them in designated locations. Everyone associated in the school science laboratories shares the responsibility to manage and dispose of waste in a manner that it will generate the least impact on the laboratory users and the environment. A well-defined waste disposal program guarantees that these wastes are appropriately managed to reduce the potential threat to our students, teachers, and other laboratory personnel.

Lourdes School of Mandaluyong is committed to designing and implementing practices and programs that will ensure proper handling, storage, and disposal of chemicals.

OBJECTIVES:

1. Ensure the safety of the students, teachers, and other laboratory users by preventing accidents related to improper waste disposal
2. Comply with the existing government regulations regarding the proper chemical waste disposal
3. Educate all laboratory users to create awareness and invigorate them to embrace the responsible practice of chemical waste management
4. Develop among laboratory users a sense of responsibility in the use and care of the laboratory

GUIDELINES:

1. Roles and Responsibilities

A. Science Coordinator

> Supervises the laboratory assistants on the proper management of chemical wastes in terms of appropriate handling, storage, and disposal.

> Provides training and seminar workshops to the laboratory assistants to develop and enhance their skills in proper handling, storage, and disposal of chemicals.

> Submits a copy of the updated laboratory inventory, containing the hazardous chemicals to the School Pollution Control Officer (PCO) to ensure compliance to all government regulations.

B. Laboratory Assistants

> Coordinate with the Science Coordinator in the proper handling of chemical wastes
> Ensure each waste container has a proper label
> Conduct pre-disposal procedures
> Neutralize acid-check the pH prior to disposal down the drain
> Forward form for disposal of chemicals to the Physical Plant and Facilities Office
> Check regularly the MSDS (Materials Safety Data Sheet) and to make it accessible to all laboratory users during the conduct of laboratory activities

C. Teachers

> Coordinate with the Laboratory Assistant regarding chemical waste disposal
> Follow all procedures and policies on chemical waste disposal
> Provide orientation to the students regarding the proper handling, storage, and disposal of chemical wastes
> Supervise the students while performing their laboratory activities to ensure proper handling and disposal of chemical wastes

D. School Pollution Control Officer

> Coordinate with the Waste Management agencies or organizations accredited by DENR - Environmental Management Bureau (EMB)
> Arrange the final disposal agreement with the partner agency or organization

2. Inventory of Chemicals

> Make a master inventory of all the chemicals used in the laboratory.
- Include chemical name and quantity
- Physical location
- Potential hazard

> Accomplish by inspecting every workstation's raw materials and storage areas.

> Always consult the Materials Safety Data Sheets (MSDS) for additional information.

3. Storage and Handling

All laboratory work with chemicals eventually produces chemical waste. Everyone involved with the science laboratory shares the legal and moral responsibility to manage the proper disposal of chemical wastes. Depending on what is contained in the waste; some waste must be professionally deposited in the designated landfills, while other waste can be neutralized or discharged in the normal way.

A. Minimizing Waste

> Look for Alternative Substances
> Practice Micro scale Laboratories
> Coordinate Laboratory Work

B. Waste Storage Prior to Disposal

> All wastes should be stored in properly labeled containers. The label should contain the date and type of waste.
> Wastes should be segregated to avoid unwanted reactions and to allow cost-effective disposal.
> Wastes should be stored in closed containers.
> Maintain a central secure waste storage area.

4. Disposal

A. For the laboratory chemical wastes

A.1 Conduct Pre-Disposal Procedures

A.1.1 Proper labeling of Chemicals/Wastes

Chemical wastes generated from the laboratories are generally of small quantity and relatively dilute in nature. However, a few common waste types are classifiable as chemical waste. They include the following: strong acids and alkalis; spent organic solvents; and surplus or expired chemicals.

All chemicals are disposed of in labeled waste containers (stored in hazardous waste area).

A.1.2 Classify or segregate chemical wastes

A.1.2.1 Segregation of chemical waste is necessary so that waste can be safely collected and disposed of. Chemical waste must be segregated in such a manner that only chemically compatible wastes are allowed to be mixed together.

A.1.2.2 Surplus or expired chemicals should be segregated, individually packaged, and labeled for storage, prior to collection.

A.1.3 Packaging of chemical wastes

A.1.3.1 Chemical wastes should be poured into the appropriate containers.

A.1.3.2 Workplaces should have sufficient chemical waste containers and be stored safely.

A.1.3.3 Every chemical waste container should be properly closed and stored. The container should be kept clean.

A.1.3.4 When filling the container with liquid chemical wastes, sufficient air space should be allowed to ensure that neither leakage nor permanent distortion of the container occurs as a result of liquid expansion caused by changes in temperature or other physical conditions that are likely to occur under normal conditions of handling, storage, and transport. Generally, 10 cm of air space should be sufficient.

A.1.4 Provide storage of chemical wastes

A.1.4.1 Chemical wastes should be stored appropriately with spill catcher trays in their base.

A.1.5 Consider environmental hazards and costs of disposal

A.1.6 Check chemical incompatibilities

A.1.7 Provide schemes for the classification of chemical wastes

A.1.7.1 Identification of Hazardous Chemical Waste

Characteristics of hazardous waste

If a waste meets one or more of the following four “characteristics” it is considered a hazardous waste for purposes of disposal.

1.1.7.1.1 **Ignitability**

Any liquid having a flashpoint of less than 140 degrees F is an “ignitable” material. This includes almost all organic solvents (alcohols, alkanes).

1.1.7.1.2 **Corrosivity**

Any aqueous material having a pH less than or equal to 2.0 or greater than or equal to 12.5 is a corrosive material.

Any liquid or solid that corrodes steel at a rate greater than ¼” per year at 130 degrees F is corrosive.

All common organic and mineral acids are considered corrosives.

1.1.7.1.3 Reactivity

Reactive with the air or water, is explosive, or is cyanide or sulfide.

1.1.7.1.4 **Toxicity**

Has certain levels of certain metals, solvents, or pesticides greater than prescribed limits.

2.1 Inspection of Stored Chemicals

Chemicals showing any of the indications listed below should be sent for disposal:

- Slightly cloudy liquids that were once clear
- Darkening or change in color
- Spotting on solids
- Caking of anhydrous materials indicating uptake of water
- Existence of solids in liquids or liquids in solids
- Pressure build-up in containers
- Evidence of reaction with water
- Corrosion or damage to the container
- Missing or damaged (i.e., illegible) labels

- Old chemicals of unknown origin (e.g. research materials)

2.2 Handling of Surplus or Expired Chemicals

2.2.1 Leave chemical in original packing and label. If the original packing is not in good condition and presents a risk of leakage, wrap and seal the bottle in a PE plastic bag, or other overpack of compatible nature.
2.3.2 On each bottle, attach a second label listing the following information: (i) name of department, (ii) chemical name, (iii) quantities, (iv) particular risks and safety precautions.
2.3.3 Store these chemicals in stainless steel (organics) or plastic (inorganics) catch trays in chemical waste storage cabinets.
2.3.4 For surplus or expired chemicals, please fill in the Labpack Form to be forwarded to the Collection Service.

2.4 Treatment of Chemical Waste

2.4.1 Neutralization of Acids and Bases

2.4.1.1 Neutralize acid-check the pH prior to disposal down the drain.
2.4.1.2 Proper dilution is done to the chemical wastes and poured or flushed into the lavatory.
2.4.1.3 Acids and bases should be at least above pH 3 and below pH 8 before being placed in a sanitary drain.

2.5 Collection

2.4.1 Formulate a schedule

2.4.2 Request Form of “Certificate of Assurance”

2.4.3 Submission to Authorized Personnel

2.4.4 Prepare waste containers

B. SPILLS AND HAZARD CONTROL

1. Genera; Notes on Chemical Spills

1.1 Spills should be contained, the area cleared of students, and the spill cleaned immediately.
1.2 Waste from spill clean-up should be disposed of appropriately.
1.3 After floor spill has been thoroughly cleaned up in the appropriate manner, the area should be mopped dry to minimize the risk of slipping and falling.

1.4 Spills that Constitute Fire Hazard

1.4.1 Extinguish all flames immediately
1.4.2 Shut down experiments
1.4.3 Vacate the laboratory room until the situation has been corrected

1.5 Other Spills

1.5.1 Use an absorbent material to neutralize the liquids. Materials include:

1.5.1.1 For acids: powdered sodium bicarbonate
1.5.1.2 For bromine: sodium thiosulfate solution (5-10%) or lime water.
1.5.1.3 For organic acids, halides, non-metallic compounds, or inorganic acids: use slaked lime and soda ash
1.5.1.4 For general spills: use commercial absorbent or spills kits, small particles of clay absorbents
1.5.1.5 Wear rubber gloves and use a dustpan and brush. Clean the area thoroughly with soap and water then mop dry.

1.5.1.6 Aromatic amine, carbon disulfide, ether, nitride, nitro compound, and organic halide spills: should be absorbed with cloths, paper towels, or vermiculite and disposed of in suitably closed containers.

References:

A Guide to the Chemical Waste Control Science – EPD

Code of Practice on the Packaging, Labeling, and Storage of Chemical Wastes – EPD