PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

School Chemical Cleanout Campaign (SC3)

Chemical Management Training

INTRODUCTION

Kevin Beer

Environmental Chemist
Pennsylvania Department of
Environmental Protection (PADEP)

kbeer@pa.gov 717.787.6239

AGENDA

TIME(S)	SUBJECT MATTER
8:30	**WELCOME/ORGANIZATION**
	INTRODUCTION Incidents of HS Chemical Accidents Hazard Recognition
	IMPORTANCE OF CHEMICAL SAFETY Commitment, Roles, and Responsibilities
	CHEMICAL HYGIENE PLANS • Outline and Development • Written Plan and Updating • Material Data Safety Sheets (SDS)

AGENDA (CONT.)

TIME(S)	SUBJECT MATTER
10:00 – 10:15	**BREAK**
	CHEMICAL HYGIENE PLANS (CONT.) • Inventory and Purchasing Plan • Labeling • Storage of Chemicals • Proper Organization of Chemicals • Storage of Gas Cylinders
12:00 – 12:30	**LUNCH**
	CHEMICAL HYGIENE PLANS (CONT.) • Safety Equipment • Spill Control • Emergency Plans • Reduction of Stored Chemicals • Disposal of Chemicals

AGENDA (CONT.)

TIME(S)	SUBJECT MATTER
2:00 – 2:15	BREAK
	APPLICATION REVIEW OF SCHOOL CHEMICAL CLEANOUT PROGRAM
	REVIEW AND QUESTIONS
3:00	DEPARTURE

RECENT LAB INCIDENTS

They are occurring everyday of the week. What can be learned from them?

Some of us may have witnessed unsafe behavior or minor accidents, and yet, rather than viewing these incidents with concern and as opportunities to modify practices and behavior, we often have failed to act upon these "teachable moments."

From Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards – Preface

Monday January 23, 2012

Science Experiment Ends in Evacuation of Dallastown Area High School

Tuesday, August 28, 2012

School Evacuated after 12 Students Injured in Science Lab Explosion at Moss Vale High School

Wednesday October 10, 2012

Albert Gallatin Teacher Hospitalized after ‘Chemical Spill’

Wednesday October 24, 2012

Derry High School Teacher Hurt when Chemistry Experiment Explodes

Thursday November 10, 2011

Chemical Spill Clears the Line
Mountain High School

Thursday, February 23, 2012

Fire Erupts in Hamburg High Chemistry Lab

Lab Experiment Sparks Tanana Middle School Evacuation

Friday December 9, 2011

Canby High School Evacuated After Chemistry Lab Fire

Each individual influences the "culture of safety" in the laboratory. All of us should recognize that the safety of each of us depends on teamwork and personal responsibility as well as the knowledge of chemistry.

From Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards – Preface

LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

Since the age of alchemy, laboratory chemicals have demonstrated dramatic and dangerous properties. Some are insidious poisons.

From Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards – Chapter 1

LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

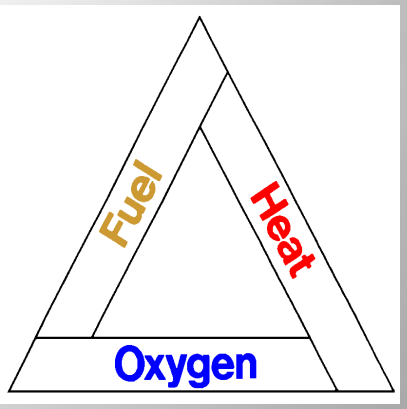
Laboratory chemicals and operations are inherently hazardous. The hazards may be classified into two groups – Physical and Chemical

Physical Safety Hazards

Include fire, explosion, skin cuts and abrasions, and extreme temperature.

Examples

- Compressed Gases
- Explosives
- Flammables
- Organic Peroxides
- Oxidizers
- Unstable Substances
- Water-reactive Substances



LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

Chemical Health Hazards

Are substances that are hazardous to health when they enter the human body in sufficient quantity. The toxicity depends greatly on phase (e.g., gas, liquid, or solid) of substance, route of entry, duration of exposure and the quantity which is absorbed into the body. A substance can have acute or chronic health effects.

LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

Examples

- Carcinogens
- Corrosives
- Highly Toxic Substances
- Irritants
- Sensitizers

LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

There are four main routes by which chemical substances can enter the body:

- Inhalation (dusts, fumes, mists or vapors)
- Ingestion (eating or drinking with contaminated hands or in a contaminated laboratory)
- Absorption (contact with liquid, dusts, fumes, mists or vapors)
- Injection (accidental puncture of the skin with contaminated glass or metal)

LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

Chemical Substance Classes and Their Health Effects

- **Acids**: Acetic, hydrochloric, nitric, and sulfuric acids are corrosive to skin and mucous membranes.
- **Alcohols**: Methanol induces blindness via ingestion or prolonged inhalation. Ethyl alcohol depresses central nervous system by ingestion or prolonged inhalation.
- **Aldehydes and ketones**: Acetaldehyde (ethanal) and acetone are irritants and have narcotic effects via inhalation, absorption, or ingestion.
- **Aliphatics:** Acetylene, methane and ethane are central nervous system (CNS) depressants, asphyxiants, neurotoxins.

LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

- **Alkalies**: Sodium, potassium and ammonium hydroxide can cause severe tissue burns and bronchial spasms.
- **Asphyxiants**: Reduces the oxygen carrying capacity of the blood (e.g., CO) or displaces atmospheric oxygen (e.g. CO_2).
- **Compounds of sulfur, phosphorus, nitrogen**: SO_2, H_2SO_4(aq), H_3PO_4(aq), and nitrogen oxides are corrosive to the skin and destructive to respiratory tissues.
- **Halogens:** Chlorine, bromine and iodine are corrosive and highly irritating to tissues.
- **Metal fumes/vapors:** Metal fumes and vapors can cause systemic poisoning via ingestion and inhalation. Toxic effects may be compounded with prolonged exposure.

LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

The ability to accurately identify and assess hazards in the laboratory is not a skill that comes naturally; it must be taught and encouraged through training and ongoing organizational support.

From Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards - Chapter 1

IMPORTANCE OF SAFETY

A crucial component of chemical education at every level is to nurture basic attitudes and habits of prudent behavior so that safety is a valued and inseparable part of all laboratory activities.

From Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards – Chapter 1

IMPORTANCE OF SAFETY

Da Rulz by Anthony Lowe, Guilford College

IMPORTANCE OF SAFETY

- It is essential for all involved in the science instruction program to develop a positive approach to a safe and healthy environment in the school.

- Safety and health should be an integral part of the planning, preparation, and implementation of any science program.

- Safety and the enforcement of safety regulations and laws in schools, classrooms, and laboratories are the responsibility of the principal, teacher, and student, each assuming his/her role and share of the program.

IMPORTANCE OF SAFETY

The Principal's Role and Responsibilities

- Recognize the need for establishing safety and health instruction as a fundamental part of the science curriculum.
- Initiate development of a laboratory safety program and provide the support necessary for implementation.
- Hold the teachers accountable for operating their classrooms and labs in a safe manner.
- Ensure school wide compliance with applicable federal, state and local regulations with regard to safety such as the Occupational Safety and Health Act of 1970.

IMPORTANCE OF SAFETY

The Teacher's Role and Responsibilities

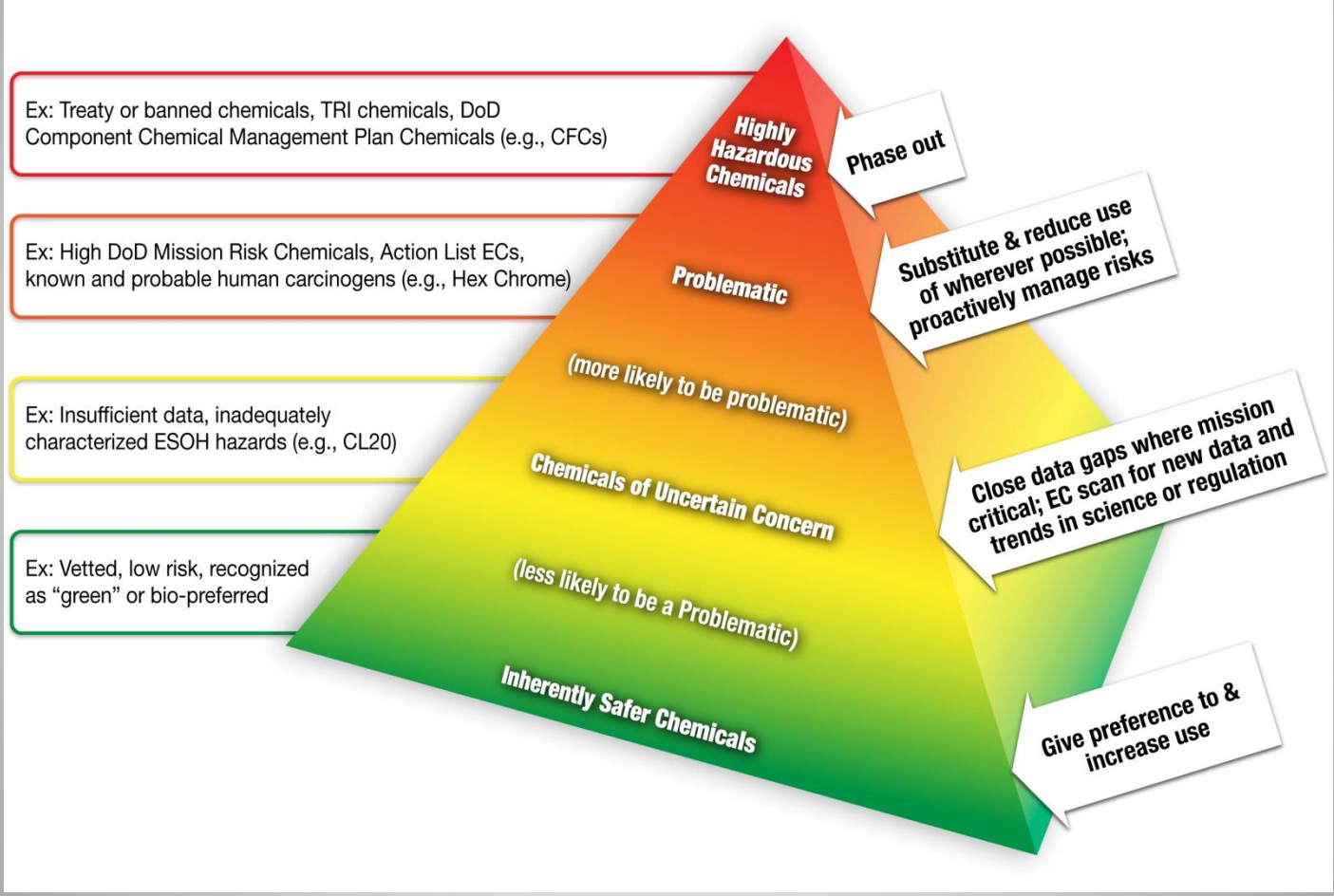
- Provide a safe and healthful learning environment for the students through implementation of the school's safety plan.
- Instruct the students in the basic safety practices required in the school laboratories.
- Impress the need for caution and preparation before working with chemicals in school laboratories.
- Instruct the students regarding the hazards that are associated with the chemicals being used.
- Provide safety information and training to the students for each stage of the experiment.

IMPORTANCE OF SAFETY

The Student's Role and Responsibilities

- Respect the principal, teachers, and operations staff in their efforts to provide a safe and healthful learning environment.
- Learn the basic safety practices required in the school laboratories.
- Follow teacher instruction and exercise the proper caution when working with chemicals in school laboratories.
- Heed the hazard warnings associated with any chemicals being utilized.
- Pay close attention to the safety information and training provided for each stage of the experiment.

The Written Plan for Chemical Management



Chemical Management Strategy Pyramid from DoD policy manual

The Written Plan is also called a CHEMICAL HYGIENE PLAN (CHP)

Definition:

A Chemical Hygiene Plan (CHP) is a written program stating the policies, procedures, and responsibilities that serve to protect employees, students, visitors, and others from the health hazards associated with the hazardous chemicals used in that particular work place.

CHEMICAL HYGIENE PLAN

Required Elements for a CHP

1. Standard Operating Procedure (SOPs)
   SOPs should be written, detailed activities that are relevant to the safety and health considerations of each activity as they involve the use of hazardous chemicals.

2. Control Measures
   A method or criteria to determine and implement control measures to reduce exposure to hazardous materials. The selection of control measures may include engineering controls, the use of personal protective equipment, administrative controls, and hygiene practices.

CHEMICAL HYGIENE PLAN

3. Safety Equipment
   A detailed plan, checklist, or inspection process to ensure laboratory chemical hoods and other protective equipment are installed and functioning properly.

4. Chemical Hazard Information
   Information for persons working with hazardous substances specifying the hazards of the chemicals in the work area, the location of the CHP, signs and symptoms associated with hazardous chemical exposures, the permissible or recommended exposure limits of the chemicals, and the location and availability of information on the hazards, safe handling, storage, and disposal of hazardous chemicals (not limited to Safety Data Sheets [SDSs]).

CHEMICAL HYGIENE PLAN

5. Training
   SOPs should be written, detailed activities that are relevant to the safety and health considerations of each activity as they involve the use of hazardous chemicals.

6. Mechanism for Approval of Laboratory Procedures
   The circumstances under which a particular laboratory operation or procedure requires prior approval from the appropriate administrator.

CHEMICAL HYGIENE PLAN

7. Requirements of Medical Situations
   The plan shall detail requirements for medical consultation and medical examinations. At a minimum, medical reviews shall occur whenever (1) a person develops signs or symptoms associated with a hazardous chemical, (2) exposure monitoring reveals an exposure level routinely above the action level, and/or (3) an event takes place in the work area, such as a spill, leak, explosion, or any other occurrence resulting in the likelihood of a hazardous exposure.

8. Responsible Parties
   The plan shall designate the personnel responsible for the implementation of the CHP, including the assignment of a Chemical Hygiene Officer or Chemical Coordinator.

CHEMICAL HYGIENE PLAN

9. Special Requirements
   Special requirements shall be included for additional protection when working with particularly hazardous substances, including “select carcinogens,” reproductive toxins, and substances with a high degree of acute toxicity.

10. Evaluation of Plan
    The plan must have provisions for a yearly re-evaluation.

CHEMICAL HYGIENE PLAN

CHP Action Plan - The First Three Steps

1. Appoint a Chemical Coordinator

   The Chemical Coordinator is responsible for:

   a. Developing and/or Approving SOPs
   b. Reviewing and ordering safety supplies
   c. Coordinating the inventory of chemicals
   d. Reviewing and Approving Chemical Orders
   e. Establishing and Enforcing Disposal Procedures

CHEMICAL HYGIENE PLAN - CHP Action Plan

2. Institute an Inventory/Tracking System

- Need to start with an inventory to identify all chemicals that are present in the school.
- This detailed study will enable the chemical coordinator to evaluate the chemicals and determine which are excess or unsafe, and need to be removed from the school.
- Also, having a complete chemical inventory will also enable the chemical coordinator to avoid purchasing chemicals that are already present in the school.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Allow sufficient time to complete the inventory, and investigate all potential chemical storage areas.

- Conducted the inventory by using a team of two or more people. One person read out the name and quantity of each chemical, while the other person records the information on the inventory form.

- Use a detailed inventory form to document the chemicals.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Collect adequate information on each chemical. The minimum information collected should include location, chemical name, container size, number of containers, condition of the containers, use of material, and other information from the label, such as purchase date or expiration date.

- Establish a tracking system, such as a paper card system or an electronic database of chemicals in the school.

CHEMICAL HYGIENE PLAN - CHP Action Plan

3. Control of Purchase

- Establish centralized purchasing program with the Chemical Coordinator handling all of the purchasing requests and linking the purchases to the inventory tracking system so that excess chemicals in stock can be used before buying more.

- Establish training for receiving personnel to ensure proper methods of receiving and handling of hazardous substances are used.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Always purchase the least hazardous chemical that will do the job. Use “Green Chemicals” and low volatile organic compound (VOC) cleaners and paints. Both are preferable from both a hazardous material management and an indoor air quality (IAQ) standpoint.

- Do not accept samples or donated chemicals or products, unless they are needed for a specific purpose or project.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Request a SDS for each chemical or product purchased from your manufacturer or shipper. These documents need to be readily accessible to both personnel who use the products and to emergency responders. A copy of all SDSs should be kept in the chemical coordinator's office. A SDS for each chemical in a given storage area should be kept near, but not inside, that storage area.

- Your goal should be to try to minimize the total quantity of each hazardous material in storage to just what will be actually needed before the next order.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Establish a control system and enforce it. Perhaps try when a chemical or product is received, mark the date on the package or case. When an individual container is opened, mark this date on it, along with the expiration date, for products that have a limited shelf life after opening.

CHEMICAL HYGIENE PLAN

High Risk Chemicals

Some chemicals have such a high risk associated with them because of their hazardous characteristics that they should not be used in schools for any purpose.

Teachers who want to use any of these chemicals for a unique science experiment should either purchase the smallest amount possible, or a dilute solution. It is preferable to present a similar experiment that does not require the use of a high risk chemical. Students should not be permitted to handle or perform experiments using any of the following high risk chemicals.

CHEMICAL HYGIENE PLAN - CHP Action Plan

Examples of High Risk Chemicals

1) Mercury
2) Peroxidizable Solvents and Metals
3) Oxidizers
4) Highly Reactive Chemicals
5) Highly Toxic Chemicals
6) Chemicals Regulated by the DEA
7) Radioactive Materials
8) Formaldehyde

CHEMICAL HYGIENE PLAN

- Safety Data Sheets (SDS)

  - ✓ The OSHA Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly Material Safety Data Sheets or MSDSs) to communicate the hazards associated with chemical products.

  - ✓ As of June 1, 2015, the HCS will require new SDSs to be in a uniform format with specific section numbers, headings, and associated information under the headings.

  - ✓ Employers must ensure that SDSs are readily accessible to employees. Appendix D of 29 CFR 1910.1200 provides a detailed description of SDS content.

CHEMICAL HYGIENE PLAN

SDS Section Headings

Section 1	Identification
Section 2	Hazard(s) identification
Section 3	Composition/information on ingredients
Section 4	First-aid measures
Section 5	Fire-fighting measures
Section 6	Accidental release measures
Section 7	Handling and storage
Section 8	Exposure controls/personal protection

CHEMICAL HYGIENE PLAN

SDS Section Headings continued

Section 9 Physical and chemical properties

Section 10 Stability and reactivity

Section 11 Toxicological information

Section 12 Ecological information

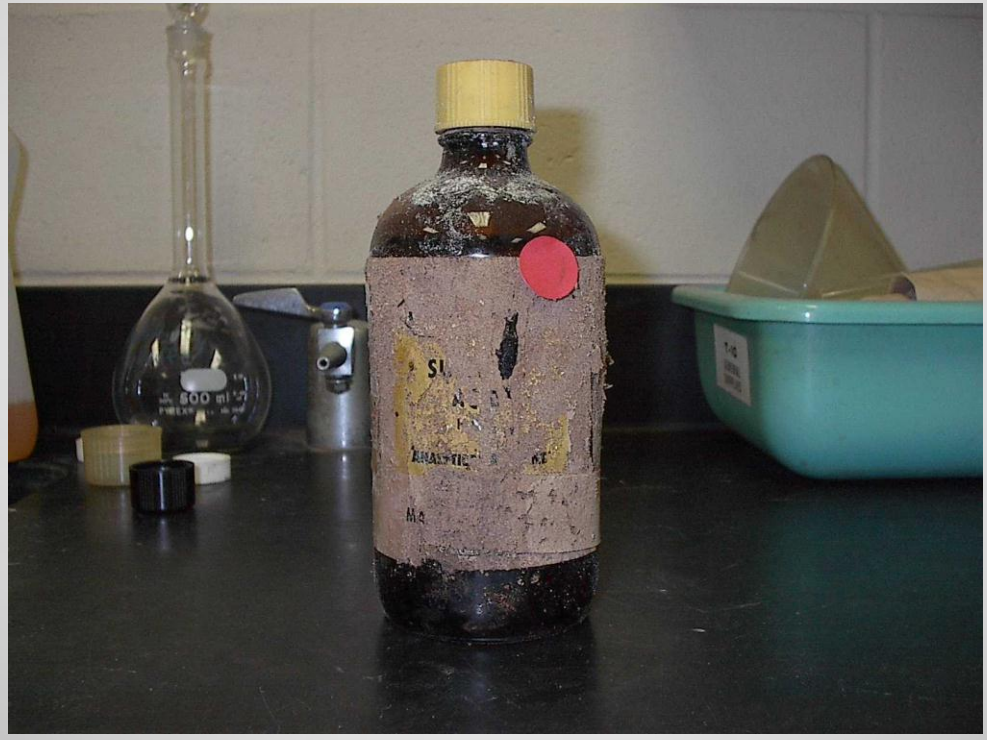
Section 13 Disposal considerations

Section 14 Transport information

Section 15 Regulatory information

Section 16 Other information

LABELING



CHEMICAL HYGIENE PLAN

Labeling

- Labeling Basics
  - ✓ Use labels with good adhesive.
  - ✓ Use a permanent marker (waterproof and fade resistant) or laser (not inkjet) printer.
  - ✓ Print clearly and visibly.
  - ✓ Replace damaged, faded or semi-attached labels.

CHEMICAL HYGIENE PLAN

- Labeling Chemicals
  - Commercially Packaged Chemicals

    Upon delivery – verify that the label contains the following information:
    - ✓ Chemical name (as it appears on the SDS)
    - ✓ Name of chemical manufacturer
    - ✓ Necessary handling and hazard information

    We suggest that you add:
    - ✓ Date received
    - ✓ Date first opened
    - ✓ Expiration or “use by” date (if one is not present)

CHEMICAL HYGIENE PLAN

- Secondary Containers and Prepared Solutions

  Upon transferring a material from the original manufacturer's container to other bottles or containers, these are referred to as "secondary containers."

- Secondary Containers and Prepared Solutions

  Label all containers used for storage with the following:

  - ✓ Chemical name (as it appears on the SDS)
  - ✓ Name of the chemical manufacturer or person who prepared the solution
  - ✓ Necessary handling and hazard information
  - ✓ Concentration or purity
  - ✓ Date prepared
  - ✓ Expiration or "use by" date

CHEMICAL HYGIENE PLAN

- Containers in Immediate Use

  All chemicals are to be used within a given day or classroom session should be labeled clearly.

  Label all containers in immediate use with the following:
  - ✓ Chemical name (as it appears on the SDS)
  - ✓ Necessary handling and hazard information

CHEMICAL HYGIENE PLAN

- Labeling of Chemical Waste

  All containers (large or small) used for chemical waste should be labeled as follows:
  - ✓ WASTE" or "HAZARDOUS WASTE"
  - ✓ Chemical name (as it appears on the SDS)
  - ✓ Accumulation start date
  - ✓ Hazard(s) associated with the chemical waste

- Labeling Peroxide-Forming Substances

  Peroxide-forming chemicals must be labeled as follows:
  - ✓ Date received
  - ✓ Date first opened
  - ✓ Date to be disposed of

CHEMICAL STORAGE

CHEMICAL HYGIENE PLAN

Chemical Storage

As you know, a variety of different chemicals with different hazards may be present in different departments in a given school. Improper storage of these chemicals may lead to an increased risk of reaction in the event of container failure or spillage. Proper storage of chemicals will help to reduce this risk.

- Do not store chemicals randomly or in alphabetical order. This increases the risk of incompatible chemicals coming into contact, especially in the event of a fire or other emergency event.

CHEMICAL HYGIENE PLAN

- Do not store chemicals in a laboratory hood, on bench tops or under sinks. They interfere with the airflow in the hood, are more easily knocked over and could potentially spill into a drain.

- Do not store flammable chemicals in a regular refrigerator. This could result in an explosion and fire. If flammables must be refrigerated, store them in a designated explosion-proof or flammable material refrigerator. Do not store food in a designated chemical refrigerator.

CHEMICAL HYGIENE PLAN

- Flammable and volatile chemicals should always be stored tightly capped to keep their vapors from interacting and to reduce the potential for human exposure.

- Always store flammable materials in a flammable storage cabinet, well away from oxidizers.

- Do not store combustible materials inside or on top of flammable material storage cabinets.

CHEMICAL HYGIENE PLAN

- Store corrosive materials in corrosion-resistant containers and cabinets.
- Store acids and bases separately.
- Store oxidizing acids, such as nitric acid and perchloric acid separate from other acids.
- Liquids, corrosive chemicals, and glass containers should not be stored on shelve above eye level. It is preferred that no chemicals be stored above eye level.

CHEMICAL HYGIENE PLAN

- Store heavier containers at a level that is consistent with its size and anticipated use. For example, five-gallon buckets with handles could be stored on a pallet on the floor, while smaller heavy products should be stored on a shelf at waist height to minimize bending and twisting while lifting, which could lead to back or shoulder strain.

- Secondary containers or totes should be used to minimize the flow of material in the event of a spill or container leak. The materials should be segregated by hazard category.

CHEMICAL HYGIENE PLAN

- Laboratory Chemical Segregation
  - There are a variety of laboratory chemical segregation plans available for use. Some of which are very specialized. They can be based on hazard class or chemical incompatibility.
  - Other plans are derivations from that outlined in the National Research Council's Prudent Practices in the Laboratory: Handling and Disposal of Chemicals.
  - Many universities publish diagrams of recommended chemical storage systems on their websites.

CHEMICAL HYGIENE PLAN

- Chemical supply companies also often have recommended plans for chemical storage in their catalogs or other distributed reference manuals.

- Many of these systems are based on a series of codes for functional classes of chemicals.

CHEMICAL HYGIENE PLAN

SAFE LAB

Suggested Shelf Storage Pattern

A suggested arrangement of compatible chemical families on shelves in a chemical storage room, suggested by the *Flinn Chemical Catalog/Reference Manual*, is depicted on the following page. However, the list of chemicals below does not mean that these chemicals should be used in a high school laboratory.

- First sort chemicals into organic and inorganic classes.
- Next, separate into the following compatible families.

Inorganics	Organics
1. Metals, Hydrides	1. Acids, Anhydrides, Peracids
2. Halides, Halogens, Phosphates, Sulfates, Sulfites, Thiosulfates	2. Alcohols, Amides, Amines, Glycols, Imides, Imines
3. Amides, Azides*, Nitrates* (except Ammonium nitrate), Nitrites*, Nitric acid	3. Aldehydes, Esters, Hydrocarbons
4. Carbon, Carbonates, Hydroxides, Oxides, Silicates	4. Ethers*, Ethylene oxide, Halogenated hydrocarbons, Ketenes, Ketones
5. Carbides, Nitrides, Phosphides, Selenides, Sulfides	5. Epoxy compounds, Isocyanates
6. Chlorates, Chlorites, Hydrogen Peroxide*, Hypochlorites, Perchlorates*, Perchloric acid*, Peroxides	6. Azides*, Hydroperoxides, Peroxides
7. Arsenates, Cyanates, Cyanides	7. Nitriles, Polysulfides, Sulfides, Sulfoxides
8. Borates, Chromates, Manganates, Permanganates	8. Cresols, Phenols
9. Acids (except Nitric acid)	
10. Arsenic, Phosphorous*, Phosphorous Pentoxide*, Sulfur	

*Chemicals deserving special attention because of their potential instability.

CHEMICAL HYGIENE PLAN

Gas Cylinder Storage and Handling Basics

The safe handling of compressed gas cylinders is critically important because compressed gas cylinders present two hazards. The hazards are as follows:

- Potentially toxic, corrosive, or flammable chemical hazard associated with the gas itself
- Physical hazard of the high pressure gas cylinder

An example of an extreme hazard may occur would be if the cylinder valve gets sheared off in an accidental fall, the cylinder literally would become a rocket that can smash through a cinder block wall.

CHEMICAL HYGIENE PLAN

- Planning
  - Purchase cylinders from companies that will accept the cylinder back. Even nonhazardous compressed gas cylinders can be costly to dispose. Purchase only the size and quantity of cylinders that you need.
  - Most high school laboratories are not adequately equipped to safely handle toxic gas cylinders.
  - If considering the use of a toxic gas cylinder for a demonstration, seriously evaluate whether you really need and can safely store and use the product.

CHEMICAL HYGIENE PLAN

- Do not rely on color coding to identify the contents of a compressed gas cylinder. There is no universal standard. Different manufacturers use different color codes. Always check the label.
- Do not use cylinders with missing or illegible labels.

- Safe Storage
  - When the cylinder is not in use, the valve protection cap must be in place to protect the valve.
  - Never drag, slide or roll the cylinder – get a cylinder cart or truck and use it. The cylinder must be secured to the cart during transport.

CHEMICAL HYGIENE PLAN

- Never transport the cylinder with the regulator in place – have the valve protection cap on.

- Cylinders must be secured at all times to a wall, lab bench, cylinder storage rack, or welding cart. Use an appropriate material to secure the cylinder: chain, wire rope, straps, etc. The support should contact the cylinder at a point approximately 2/3 of its height.

- Don't store gas cylinders in public hallways or other unprotected areas. Gas cylinder storage should also be segregated by hazard class. Flammable gas should be stored either at least 20 feet from oxygen and oxidizers, or separated by a one-hour fire-rated wall.

CHEMICAL HYGIENE PLAN

- When a cylinder is empty, mark “Empty” or “MT” on the cylinder or tag, or tear off the last strip if it has a perforated status tag. Empty cylinders must still be segregated and properly supported.

- Safe Use
  - Check the cylinder for damage before use.
  - Make sure the cylinder has the correct regulator.
  - Do not use grease or oil on the regulator or cylinder valve, especially with oxygen – an explosion may result.

CHEMICAL HYGIENE PLAN

- Only open the cylinder valve with a regulator in place. Open the valve all the way – do not leave the valve part way open. When the cylinder is not in use, close the valve, even if it is empty – air and moisture may enter through the open valve, causing contamination and corrosion.

- Tanks of acetylene should only be used in the upright, valve on top position. The acetylene gas is dissolved in liquid acetone inside the tank. Do not use copper or bronze fittings or tubing on acetylene tanks as this may cause an explosion. All oxygen/acetylene setups must have a flashback arrestor check valve at the regulators.

CHEMICAL HYGIENE PLAN

- Do not heat a cylinder to raise the pressure of the gas. The cylinder has a temperature sensitive safety device to prevent overpressure, and heating the cylinder could cause it to activate, releasing the gas. Similarly, do not allow the cylinder to be near sparks or open flames, or to come into contact with electric wires.

CONTROL MEASURES

CHEMICAL HYGIENE PLAN

7. Control Measures

   Personal protective equipment (PPE) is often used when the risk of contact with a hazardous material cannot be otherwise controlled. It is a barrier between the material and the chemical user, either by physically preventing contact, or by filtering the chemical from the atmosphere.

   PPE is therefore the last line of defense before the chemical contacts the user. As such, it should not be the primary means of controlling the exposure risk.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Primary Controls

  As mentioned, Elimination, Substitution and Reduction are the preferred methods of reducing the risks of exposure to chemical agents. After exhausting those routes, administrative controls and ventilation strategies should be explored before resorting to PPE.

  Administrative Controls

  – Administrative controls involve controlling who accesses the hazardous chemicals, how often, and how much of each chemical is present.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Access to chemical storerooms should be limited, and the rooms and storage cabinets should be kept locked.

- Only experienced personnel, who are familiar with the hazards and appropriate exposure controls, should be permitted to handle the chemicals.

- The chemical coordinator can also control the exposure risk by limiting the quantities of hazardous chemicals purchased and in storage at any one time.

CHEMICAL HYGIENE PLAN - CHP Action Plan

Ventilation

- Exposure to airborne hazardous chemicals can also be controlled through the use of ventilation. Two types of ventilation are commonly used: dilution ventilation and local exhaust ventilation.

- Dilution ventilation usually involves opening a window or setting up a fan to allow fresh air to come into the room. Dilution ventilation is typically appropriate when using a cleaner or paint on large surfaces, where the material is not especially hazardous. It would not be appropriate for performing laboratory experiments with volatile chemicals. Dilution ventilation is also used to control the build-up of airborne chemical contaminants in storage areas.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Local exhaust ventilation is a control that mechanically extracts the airborne dusts, mists, fumes or vapors from the point of generation and removes them from the building. The most common example in a school would be a laboratory-style hood, but other applications, such as welding hoods in metal shop, may also be present. Laboratory fume hoods should not be used for chemical storage. You should always store chemicals in the appropriate flammable cabinet, acid cabinet, or chemical stock room.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- The Role of PPE

  Even after minimizing the use of hazardous materials, PPE may still be required to reduce the exposure risks to an acceptable level. Anyone at risk of coming into contact with a hazardous material, including accidental contact and spills, should wear appropriate PPE to prevent or minimize exposure.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Selecting Appropriate PPE

  The selection of appropriate PPE requires that you recognize and evaluate each hazard, identify the potential routes of exposure, determine the required performance characteristics of the protective equipment, evaluate the cost of the various options, and then make the selection of appropriate PPE.

  - Eye and Face Protection
  - Hand and Arm Protection
  - Body Protection
  - Respiratory Protection

CHEMICAL HYGIENE PLAN - CHP Action Plan

8. Spills

The best way to prevent and manage spills is through prevention and preparation.

- Spill Prevention

  As a teacher or administrator, you can help prevent spills in your area through:

  Administrative Controls

  – Spend time educating students about potential spills and how they will be managed in your specific area or classroom.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Avoid purchasing chemicals in bulk sizes, glass containers, and in excess. All can increase the probability of spills.
- Routinely conduct an inspection of chemical containers and storage locations to identify potential leaks, degraded container conditions, or other deficiencies that can lead to leaks or spills.
- Prevent negligent student behavior including inattentiveness, carelessness, or general horseplay in work areas.

CHEMICAL HYGIENE PLAN - CHP Action Plan

Cleanliness & Physical Controls

- Maintain housekeeping in all areas and avoid clutter.
- Keep containers closed, except when adding or removing contents.
- Ensure chemicals are properly stored in appropriately sized containment during long term storage and during transport between areas or classrooms.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Preparation for Spills

  Be prepared, equipped, and trained to manage a spill.

  – Safety First.

  – Inform the students of the hazards of the chemicals stored and used in a particular work area or classroom. Ensure that they understand how to protect both themselves and their peers during regular use and during a spill.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Inform the school nurse of all chemical types stored in your school and make sure they are prepared to treat any injury that results from a spill or injuries. These include broken glass cuts, chemical burns, or extreme temperature exposures (e.g. boiling water or liquid nitrogen exposure).

- Ensure that appropriate PPE is available for everyone handling chemicals. Make sure there is an abundant supply, and that everyone is properly trained on how to safely use it.

CHEMICAL HYGIENE PLAN - CHP Action Plan

9. Contingency Planning

Prepare an Action Plan

- Conduct a Practice Drill
  - Follow action plan
  - Assess the spill
  - Call help if needed
  - Remove injured or unneeded personnel from the spill area and perform appropriate medical attention for those affected
  - Follow decontamination directions found on the product's MSDS

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Access the spill kit, and wear the appropriate PPE.
- Clean the Spill
- Discard spent/ruined PPE in the same hazardous waste container
- Evaluate the Clean-up Effort

- Emergency Spill Clean-Up Contacts List

  - Call the spill clean-up contractors if you are unable to contain the spill.
  - For spills of materials classified as “hazardous materials,” 911 should be immediately notified.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Clean-up Materials
  - Spill Kits can vary in size (5-gallon buckets, to 55-gallon drums, to mobile carts). However, they should all include basic response materials:
    - Absorbents
    - Clean-up Tools
    - PPE
  - Ensure that spill kit storage locations are all of the following:
    - Accessible
    - Convenient
    - Properly stocked
    - Properly sized

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Mercury Spills

  Mercury is a heavy metal with very unique chemical and physical properties that can exist as a liquid, vapor, or within a compound (e.g. methyl mercury). Exposure to mercury can negatively affect breathing (vapors) and cause corrosive skin burns, birth defects, and central nervous system damage.

  Spills exceeding 1 gram of mercury (the amount contained in a thermometer) should be cleaned by a professional environmental clean-up contractor that has the monitoring equipment to screen for mercury vapors. Call Poison Control or 911 if someone has inhaled mercury vapors.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Aquatic Program Chlorine Management

  Depending on the size of your school, your facility may have an indoor swimming pool. Some common chemicals associated school pools include: sodium hypochlorite (bleach), calcium hypochlorite, chlorine, hydrochloric acid, and algae control agents. Each chemical has hazards associated with their handling, use, and storage.

  – Safe Storage.

  – Chlorine gas is highly toxic and corrosive. It should never be used in an unvented, enclosed environment.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Application should only be performed by trained pool service personnel who are familiar with the appropriate safety precautions.
- Keep emergency contact information posted near the pool chemical storage location.

- Insecticides, Pesticides, and Herbicides
  - Insecticides, pesticides, and herbicides may be applied by maintenance personnel or independent contractors in order to control unwanted pests on school property.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Under no circumstances should administration personnel, teachers, faculty, or students apply, use, or handle any liquid, solid, or gaseous pest control agents. Remember that application of these agents require proper training, safety precautions, and regularly updated certifications.

- Consult your school's pesticide application policy for further details.

REDUCTION OF STORED CHEMICALS

CHEMICAL HYGIENE PLAN - CHP Action Plan

10. Reduction of Stored Chemicals or Waste

All laboratories that use chemicals inevitably produce chemical waste that must be properly removed or disposed of at an appropriate facility. It is crucial to minimize both the toxicity and the amount of chemical waste that is generated.

A waste management and reduction policy that conforms to state and local regulations should be established by the school or school district.

CHEMICAL HYGIENE PLAN - CHP Action Plan

Several things that can be done to minimize hazards, waste generation, and control costs:

- Purchase chemicals in the smallest quantity needed.
- Use safer chemical substitutes/alternatives such as chemicals which have been determined to be less harmful or toxic.
- Use microscale experiments.
- Chemical experiments using smaller quantities of chemicals
- Consider detoxification or waste neutralization steps.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Use interactive teaching software and demonstration videos in lieu of experiments that generate large amounts of chemical waste.
- Use preweighed or premeasured chemical packets (no excess chemicals remain).

For information about the EPA's Green Chemistry Program, which promotes the use of innovative technologies to reduce or eliminate the use or generation of hazardous substances, visit:

www.epa.gov/greenchemistry/
www.chemistry.org/portal/a/c/s/1/acsdisplay.html?DOC=greenchemistryinstitute/index.html

CHEMICAL HYGIENE PLAN - CHP Action Plan

Table 1. Possible substitutions	
Toxic chemicals/equipment	**Possible substitution(s)**
Mercury thermometers	Digital and alcohol thermometers
Mercury barometer	Aneroid or digital pressure sensors
Methyl orange or methyl red	Bromophenol blue, bromothymol blue
Lead chromate	Copper carbonate
p-Dichlorobenzene	Lauric acid
Dichromate/sulfuric acid mixture	Ordinary detergents, enzymatic cleaners
Alcoholic potassium hydroxide	Ordinary detergents, enzymatic cleaners

CHEMICAL HYGIENE PLAN - CHP Action Plan

11. CHEMICAL DISPOSAL

REMINDER - Any chemical discarded or intended to be discarded is a **"chemical waste."**

Defining Hazardous Waste

Hazardous chemical waste as designated by the Environmental Protection Agency (EPA) or State authority is waste that presents a danger to human health and/or the environment.

The law regulates various chemicals and their activities from "cradle to grave" - from the point they are generated as hazardous waste until they are properly destroyed, incinerated, or landfilled.

CHEMICAL HYGIENE PLAN - CHP Action Plan

To be a *hazardous* waste, the waste must first be classified as a *solid* waste.

- A solid waste is defined as any solid, liquid, or contained gaseous material that is being disposed, discarded, incinerated, recycled, or is inherently waste-like.

- Once a solid waste has been identified, the next step is to determine if it is a hazardous waste, which can be accomplished by deeming the waste as a “characteristic waste” or a “listed waste.”

CHEMICAL HYGIENE PLAN - CHP Action Plan

According to EPA regulations, there are four characteristics that define a waste as hazardous:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity

If you require further assistance in determining your hazardous waste status, contact your local PADEP Office and request the Waste Management Section.

http://www.portal.state.pa.us/portal/server.pt/community/about_dep/13464/office_locations/585263

CHEMICAL HYGIENE PLAN - CHP Action Plan

Storing Chemical Waste

- Store all waste in containers that are in good condition and are compatible with their contents.
- Clearly and permanently label each container as to its contents and label as hazardous waste (refer section titled How Should Chemical Containers Be Labeled? for specific information).
- Store waste in a designated area away from normal laboratory operations and to prevent unauthorized access.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Store waste bottles away from sinks and floor drains.
- Do not completely fill waste bottles; leave several inches of space at the top of each waste container.
- Cap all waste bottles and/or containers.

CHEMICAL HYGIENE PLAN - CHP Action Plan

Disposal Warnings

- **HAZARDOUS WASTES SHOULD NEVER BE DUMPED IN ANY DRAINS, SEPTIC TANKS, OR STORM SEWERS.**
- **DO NOT MIX HAZARDOUS WASTES TOGETHER.**
- **DO NOT MIX NONHAZARDOUS WASTE WITH HAZARDOUS WASTE - in doing so you only create more hazardous waste, which creates higher disposal costs.**

CHEMICAL HYGIENE PLAN - CHP Action Plan

Universal Waste Rule (UWR)

- Purpose of the Universal Waste Rule

  In 1995, in order to facilitate hazardous waste recycling, the EPA established simplified regulations for gathering and disposal of certain broadly generated waste, designated as universal waste.

  These wastes are subject all hazardous waste regulations, and they are not required to be calculated as hazardous waste when concluding a school's generator status.

CHEMICAL HYGIENE PLAN - CHP Action Plan

- Substances Included Within the Universal Waste Rule

  Universal wastes identified in the Rule are listed below.

  - Hazardous waste batteries
  - Fluorescent lamps
  - Mercury-containing devices (thermostats, thermometers, etc.)
  - Pesticides that have been retracted, put on hold, or gathered for discarding
  - Oil-based finishes
  - Photographic solutions

SAFETY DURING INVENTORY

Safety During the Inventory

- Wear appropriate personal protective equipment (PPE) when conducting the inventory. This should include closed-toe shoes, safety glasses, and latex or nitrile exam gloves (at a minimum).

- The chemical inventory should only be performed by personnel who have adequate knowledge and experience with chemical safety and use. Students should not be permitted to perform the chemical inventory. Make a note of any such hazardous conditions on the inventory form.

- Chemicals may pose risks because of their hazardous characteristics (flammability, corrosivity, reactivity or toxicity) and/or because their containers and contents may have deteriorated over time. Chemicals that have become shock-sensitive or containers that have become pressurized or damaged can cause serious injuries.

Safety During the Inventory

- Don’t move bulging, leaking, or deteriorated containers, unless you are sure it is safe. Don’t move any container that contains crystals in a liquid or both liquid and solid phase chemical. These are potentially explosive and should be left alone.

- Don’t attempt to open any unidentified solvent bottles, or bottles that contain any of the peroxide-forming chemicals.

- During the inventory, you will likely have to move and turn some chemical containers to be able to read the label. A flashlight and small mirror should be on hand to enable you to read labels on the backs of containers that are not safe to move, and to see items in the back of storage cabinets.

Safety During the Inventory

- Always have a telephone or other means of communication handy to summon help in the event of a spill or emergency. Review the written spill response plan that includes a list of emergency phone numbers.

- Also note the locations of the nearest emergency eyewash and shower before starting the inventory in each area.

- Wear appropriate personal protective equipment (PPE) when conducting the inventory. This should include closed-toe shoes, safety glasses, and latex or nitrile exam gloves (at a minimum).

Safety During the Inventory

- The chemical inventory should only be performed by personnel who have adequate knowledge and experience with chemical safety and use. Students should not be permitted to perform the chemical inventory. Make a note of any such hazardous conditions on the inventory form.

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Schools Chemical Cleanout Campaign (SC3) 2015

Application

The Excel Workbook will contain the following worksheets:

Package Contents	
Worksheet	Uses
Registration Information	General school identification information form. Please complete all entries.
Questionnaire	A chemical management questionnaire pertaining to your school's current management practices, policies, and procedures.
Chemical Inventory (Known)	A worksheet used to inventory all of your school's known chemicals. Please fill in as much detail as you can on this worksheet to identify and list the chemicals.
Chemical Inventory (Unknown)	A worksheet used to inventory any chemicals that are unlabeled, or unknown. Please fill in as much detail as you can on this worksheet to help identify any substances that are difficult to identify (e.g. missing labels, illegible labels).

WORKSHEET NO. 1

Registration Information

This worksheet contains basic information related to your school and the contact person whom, if the school is selected, will be actively involved in the SC3 Cleanout Project. Please complete all of the information related to your school's name, location, mailing address, and school district information. Information is also requested relating to your school's population, curriculum, and facility information. If your school is selected for this project, the emergency contacts will need to be present on the day that the chemical cleanout will take place.

PADEP 2012 School Cleanout Registration Information

Date of Application *(mm-dd-yyyy)* :

School Identification		**School District Details**	
School Name:		District:	
Contact Person:	Title:	Phone:	
Street:	City:	Mailing Address:	
Municipality:	County:	City:	
State:	Zip Code:	State:	
Phone No.:	Lat/Long:	Zip Code:	
Fax No.:	Email:	Country:	
Mailing Address *(if different from School Address)*		**Emergency Contacts**	
Name:		Name:	
Street:		Title:	
City:	State:	Phone:	24 Hr. Phone:
Zip Code:	Phone:	Name:	
Attention:		Title:	
Title:		Phone:	24 Hr. Phone:

School Type *(please check all that apply)*

☐ High School ☐ Vocational/Technical HS ☐ Public ☐ Private ☐ Parochial ☐ Charter
☐ Elementary School ☐ Middle School

Student Population *(please check appropriate box)*

☐ 1 - 500 ☐ 501 - 1,000 ☐ 1,001 - 1,500 ☐ 1,501 - 2,000 ☐ 2,001 - 3,000 ☐ 3,001 - 4,000 ☐ 4,001 - 5,000 ☐ 5,001+

School Curriculum Information *(please check all that apply):*

☐ Chemistry ☐ Biology ☐ Physics ☐ Photography ☐ Auto Repair ☐ Carpentry ☐ Industrial/Metal Shop ☐ Painting (Art)
☐ Earth/Physical Science ☐ Anatomy & Physiology ☐ Cosmetology ☐ Culinary Arts ☐ Construction Trades

School Facility Information *(please check all that apply)*

☐ Secure Chemical Storage Room ☐ Kitchen Facilities ☐ Grounds/Landscaping ☐ Maintenance Department ☐ Vehicle/Small Engine Maintenance

Certification: I certify under penalty of law that I have personally examined and am familiar with the information submitted, and that based on my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Electronic Signature *(optional)*

Name and official title of authorized representative

Optional Attachments

- Site Floor Plan ☐
- Current Chemical Management Plan ☐
- PA Dept. of Labor & Industry Hazardous Substance Survey Form (HSSF) ☐

WORKSHEET NO. 2

Questionnaire

This worksheet asks a series of questions related to your school's current chemical management practices, policies, and procedures. You may need to solicit information from several sources, in order to answer all the questions presented. Please include a description of the corresponding conditions, as well as you can. The more detail you provide, the better we will be able to evaluate your school's needs.

Questions Regarding Your Schools Current Management Practices, Policies and Procedures

Program Component	Questions	Yes/No	Description of Conditions
Purchasing	Does the school have a purchasing policy or an approved chemical list?		
	Does one person or a department make all chemical purchases? If so, please identify the person and/or department.		
	Are chemicals purchased for expected use within the calendar or fiscal year?		
	Does the school have a "green" or "micro-scale" chemistry curriculum?		
	Have toxic chemicals been replaced with less toxic alternatives?		
Storage	Does the school have a policy or set of procedures for storing chemicals (a Chemical Management Plan)?		
	Does the school have one central chemical storage location? If so, where is it located (e.g., identify by building, floor, wing, room number)?		
	Is there a staff member assigned to manage every chemical storage area? If so, please identify that person.		
	Are stored chemicals kept locked?		
	Are chemicals accessible only to qualified handlers?		
	Are chemicals properly stored? (proper storage container, storage area is adequately ventilated, secured, in a closeable cabinet, sturdy shelving)		
	Are all chemicals labeled, including name, purchase/expiration dates, and storage information (date received, date opened)?		
	Do all chemicals have up-to-date Material Safety Data Sheets (MSDS)? If so, please identify where the MSDS are stored.		
	Does the school annually submit a Hazardous Substance Survey Form (HSSF) to the Pennsylvania Department of Labor and Industry? If so, please provide a copy of the school's most recent HSSF with your application package.		

WORKSHEET NO. 3

Chemical Inventory (Known)

This worksheet is an inventory form to be used to list all of the chemicals found in your school classrooms and throughout the school buildings. Please solicit information throughout your school, including teachers and school staff who may utilize chemicals, mercury-containing equipment or thermometers from nursing areas and science departments, and materials used in vocational or technical programs (e.g., art classes). A listing of common chemicals and their CAS Registry Number can be found at:

http://oaspub.epa.gov/enviro/tri_lookups.tri_cas_lookup.

NOTE

This project will not accept waste coming from the maintenance of vehicles. This includes waste oil, cleaning solvents and other chemicals used for maintenance. The project will not accept bulk containers or other wastes generated by maintenance operations, such as solvents, floor cleaning solutions, waxes, etc. The intent of this project is to help schools clean out excess hazardous and dangerous chemicals (primarily coming from chemistry and the science departments). Furthermore, all bulk containers of waste pesticides will need to be arranged through the Pennsylvania "CHEMSWEEP Program". If you have waste pesticides needing disposal, please see information on the following website: http://www.agriculture.state.pa.us/portal/server.pt/gateway/PTARGS_0_2_24476_10297_0_43/http;/10.41.0.36/AgWebsite/ProgramDetail.aspx?name=CHEMSWEEP-Waste-Pesticide-Disposal-Program&navid=12&parentnavid=0&palid=108&

Chemical Inventory (Known)

Current Location	Chemical Name	Number of Containers	Container Size	Container Type (e.g., plastic, glass)	Condition of Container (e.g., corroded, has crystals around the cap, bulging, degraded top)	Chemical Uses? (e.g., chemistry lab, art room, school maintenance)	Needed or in Surplus Quantities	MSDS Available (Yes or No)	CAS Number	Risk Level	Health Hazard Rating	Flammability Hazard Rating	Reactivity Rating	Special Hazard Rating	Hazards	Expiration Date (mm-dd-yy)
Room 312	*Acetaldehyde (EXAMPLE)*	*1*	*1 L*	*Glass*	*Degraded top*	*Chemistry Lab*	*Surplus*	*No*	*75-07-7*	*3*	*3*	*4*	*2*		*Suspect carcinogen. Highly flammable. Peroxide former. Severe irritant to eyes*	*01/01/07*

Note: Additional rows can be added as needed; on the File menu: select "Insert" then "Rows".

WORKSHEET NO. 4

Chemical Inventory (Unknown)

This worksheet is an inventory form for any chemicals or bottles you may come across that are difficult to identify. In these instances, please provide as much information as you can safely collect from the substance and/or its container.

Chemical Inventory (Unknown)

Current Location	Chemical Container Information				Expiration Date (if known)	Physical/Chemical Characteristics (*Does the **label** provide any information pertaining to the unidentified substance's physical/chemical characteristics?*)						
	Number of Containers	Container Size	Container Type (plastic, glass, metal)	Condition of Container (corroded, has crystals around the cap, bulging, degraded top)		Physical State (solid, liquid, gas)	Appearance (color, viscosity, phase separation)	Density	Boiling Point (°C)	Vapor Pressure (mm Hg)	Solubility in Water	Melting Point
Room 312	*1*	*1 L*	*Plastic bottle (EXAMPLE)*	*Corroded, crystals around the cap*	*N/A*	*Liquid*	*Milky white liquid.*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

Definitions: °C = degrees Celsius; mm Hg = millimeters of mercury. Note: Additional rows can be added as needed; on the File menu: select "Insert" then "Rows".

Lessons Learned

Communication
Coordination
Preparation

TABLE 2

SUMMARY OF MANIFESTS

2012 SCHOOL CHEMICAL CLEANOUT PROJECT

	School Designation	County	DEP Region	Dates of Removal	Total Amount of Chemicals Removed (lbs.)
1	Albert Gallatin HS	Fayette	5	August 13 and August 16, 2012	189
2	Allderdice HS	Allegheny	5	August 16, 2012	621
3	Antietam Middle-Senior HS	Berks	3	August 7-8, 2012	84
4	Brandywine Heights HS	Berks	3	August 10, 2012	443
5	Central Tech Career and Technical School	Erie	6	August 15, 2012	285
6	Cumberland Valley HS	Cumberland	3	August 1-2, 2012	738
7	Eastern Lebanon County HS	Lebanon	3	August 10, 2012	162
8	Emmaus HS	Lehigh	2	August 10, 2012	385
9	Farrell Area HS	Mercer	6	August 15, 2012	260
10	Hamburg Area HS	Berks	3	August 10, 2012	230
11	Iroquois Junior-Senior HS	Erie	6	August 15, 2012	117
12	Line Mountain Senior HS	Northumberland	4	August 1-2, 2012	93
13	Nativity BVM HS	Schuylkill	2	August 7-8, 2012	660
14	Oley Valley HS	Berks	3	August 7-8, 2012	119
15	Penn Hills Senior HS	Allegheny	5	August 16, 2012	125
16	Southern Columbia Area HS	Columbia	4	August 2, 2012	87
17	St. Hubert Catholic HS for Girls	Philadelphia	1	August 8, 2012	629
18	Trinity HS	Cumberland	3	August 2, 2012	269
19	Upper Dauphin Area HS	Dauphin	3	August 1-2, 2012	191
20	Yough HS	Westmoreland	5	August 13 and August 16, 2012	1,330
TOTAL AMOUNT OF MANIFESTED CHEMICALS					7,017

Disposal contractor (PSC) placing flammable liquids into a 60-gallon disposal drum

Disposal contractor (PSC) placing flammable liquids into a 60-gallon disposal drum

Disposal contractor (PSC) pouring a spill control absorbent (vermiculite) into a 60-gallon disposal drum

Full, sealed, and labeled disposal drums in the loading dock area for overnight storage

Disposal contractor (PSC) loading the hazardous material disposal drums into the disposal truck

Room 202 where surplus chemicals were placed for disposal by Rockwood High School

Disposal contractor (PSC) doing inventory and record keeping of chemicals for disposal

Disposal contractor (PSC) pouring a spill control absorbent (vermiculite) into a 30-gallon disposal drum

Disposal contractor (PSC) transporting hazardous waste drums to the disposal truck

High Hazard Stabilization - Setup

High Hazard Stabilization - Equipment

High Hazard Stabilization - Cap Removal

High Hazard Stabilization – Peroxide Testing

High Hazard Stabilization – Addition of Hydroquinone

High Hazard Stabilization – Lab Pack