PACKAGING PROTOCOL FOR SCHOOL LABORATORY CHEMICALS

Introduction: In the last several CleanSweepNY collections, the program has allowed local schools to clean out, not only pesticides and elemental mercury, but also other hazardous wastes, particularly science laboratory chemicals. Note, that as stated in other sections of the CleanSweepNY website, this service is "low cost," it is not free.

The continued access to this avenue of school hazardous waste disposal is dependent on the complete cooperation and oversight of the school officials participating. Although the CleanSweepNY program assures the safety of the operation after the pesticides or other chemicals are received by the program and the hazardous waste hauler, the responsibility for safe handling, packing and transporting of school chemicals is completely at the risk and is entirely the responsibility of the school officials participating. Science laboratory chemicals are usually delivered in small quantities, and their chemical and physical properties rank these substances as some of the most hazardous materials in the State of New York.

DURING PACKAGING FOR TRANSPORT TO CLEANSWEEPNY

- Use care to prevent spillage of liquids or breaking of containers.
- Use corrugated boxes lined with plastic bags to prevent leakage.
- Use care to prevent sharp objects or broken glass in the packaging.
- Use vermiculite, speedi-dry, foam peanuts, bubble wrap, cardboard, or newspaper to cushion and separate the bottles.
- Segregate wastes according to chemical compatibility (see chart and/or seek assistance from the chemistry teacher). Avoid contact of incompatible materials.
- Pourable metallic mercury must be stored in glass.
- Any non-conforming packages are subject to rejection of the CleanSweep load.
- Loads must be secure from movement during transport.
- Use a vehicle that can isolate the chemicals from the driver's breathing air. **(Do not transport materials in any vehicle used to transport children, e.g., school busses).**
- Driver must carry a copy of the transportation document, schedule, and pink inventory sheet listing the names of the compounds.

INCOMPATIBLE CHEMICALS

- Acids could be stored with acids (Hydrochloric Acid could be boxed with Sulfuric Acid).
- Bases should be stored with Bases (Sodium Hydroxide could be stored with Potassium Hydroxide).
- Acids should not be packed with any Cyanide compounds.
- Acids should not be packaged with any Pesticides.
- Oxidizers should not be packaged with any Ignitable or Flammable liquid.
- Oxidizers should not be packaged with any Pesticides.
- Pesticides should be packed only with other Pesticides.
- Water reactive metals must be stored in a petroleum product (kerosene).
- Pourable metallic mercury, mercury spill clean up material, thermometers, manometers barometers, must be packaged separately. .

Questions can be addressed thru the CleanSweepNY Information Line at 1-877-SWEEPNY (1-877-793-3769), or by visiting the website at www.cleansweepny.org

Examples of Incompatible Chemicals	
Chemical	**Compatibility/Precautions for Mixing and Storage**
Acetic acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Acetone	Concentrated nitric and sulfuric acid mixtures
Alkali and alkaline earth metals (such as powdered aluminum or magnesium, calcium, lithium, sodium, potassium)	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia (anhydrous)	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid (anhydrous)
Ammonium nitrate	Acids, powdered metals, flammable liquids, chlorates, nitrates, sulfur, finely divided organic or combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine	See Chlorine
Calcium oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents
Carbon tetrachloride	Sodium

Examples of Incompatible Chemicals	
Chemical	**Compatibility/Precautions for Mixing and Storage**
Chlorates	Ammonium salts, acids, powdered metals, sulfur, finely divided organic or combustible materials
Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, benzene, finely divided metals, turpentine
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene hydroperoxide	Acids (organic or inorganic)
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	Everything
Hydrocarbons (such as butane, propane, benzene)	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic acid	Nitric acid, alkali
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous)

Examples of Incompatible Chemicals	
Chemical	**Compatibility/Precautions for Mixing and Storage**
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, combustible materials
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulfuric acid
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass, any heavy metals
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury
Oxygen	Oils, grease, hydrogen, flammable liquids, solids, or gases
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease, oils
Peroxide, organic	Acids (organic or mineral), avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalis, reducing agents

Examples of Incompatible Chemicals	
Chemical	**Compatibility/Precautions for Mixing and Storage**
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium chlorate	Sulfuric and other acids
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartartic acid, ammonium compounds, fulminic acid
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrate	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydrite, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric acid	Potassium chlorate, potassium perchlorate, potassium permanganate (similar compounds of light metals, such as sodium, lithium)
Tellurides	Reducing agents

Source: Introduction to Safety in the Chemical Laboratory, Academic Press.