Art Safety
DePaul University
TABLE OF CONTENTS

1. Introduction
   • Statement of Policy

2. Standard Operating Procedures (SOP)
   • Basic Studio Safety Rules
   • Personal Behavior
   • Housekeeping

3. Chemical Safety Principals and Concepts
   • Routes of Exposure
   • Controlling Chemical Exposures

4. Chemical Procurement, Distribution, and Storage
   • Inventory
   • Labeling
   • Storage
   • Distribution

5. Housekeeping, Maintenance, Inspections
   • Cleaning
   • Inspections
   • Maintenance
   • Passageways

6. Emergency Procedures
   • Emergency Assistance
   • Spill Preparedness
   • Preventing spills
   • Spill control kits
   • Defining and Classifying a spill

7. Personal Protective Equipment and Personal Hygiene
   • Attire
   • Eye Protection
   • Face Shields
   • Gloves
   • Personal Hygiene

8. Signs and Labels

9. Training

10. Waste Disposal
    • Types of Waste
    • Proper Handling of Waste

11. Painting and Drawing
    • Pigments
    • Solvents
    • Spray Painting
    • Acrylics
• Drawing Materials
• Good Practices
• Waste Handling

12. Ceramics
• Clay/Plaster
• Good Practices

13. Photography
• Black & White Photographic Processing
• Good Practices

14. Printmaking
• Hazards
• Inks
• Solvents
• Acid Solutions
• Caustic Substances
• Good Practices
• Waste Procedures

15. Wood Shop
• Shop safety
• Use of workshop

16. Digital Lab

17. Arc Welding
• General Arc Welding Safety
• PPE

APPENDIX A
Known or Probable Carcinogens/Highly Toxic Pigments

APPENDIX B
Hazards of Photographic Chemicals

APPENDIX C
Hazards of Substances used in Printmaking
1. **Introduction**

**Statement of Policy**

In accordance with the regulations of the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA), the following guidelines are intended to provide information on the safe practices of working in an Art Studio and the handling of and working with chemicals.

http://www.gpoaccess.gov/cfr/index.html

2. **Standard Operating Procedures**

It is prudent to minimize all chemical exposure. This can be accomplished by planning first as to minimize the risk of exposure and to limit use of especially hazardous chemicals.

Chemical exposure can occur through several different routes:

1. **Inhalation** (vapors, dust),
2. **contact** with skin or eyes,
3. **ingestion**, and
4. **injection**.

The following section describes the Standard Operating Procedures for using chemicals in the Art studios at DPU. Following these rules will minimize the risk of chemical exposure.

**Basic Studio Safety Rules**

All employees and students should follow these basic rules at all times:

- Never work with chemicals alone in an Art Studio or chemical storage area.
- Wear eye protection when it’s called for.
- Where exhaust fans are available (wood, metal shops, darkrooms, spray booth) turn it on before working and leave it on when you leave the area.
- When working with flammable chemicals, be certain that there are no sources of ignition near enough to cause a fire or explosion in the event of a vapor release or spill.
- Know the hazards of the chemical you are working with as determined by a MSDS (Material Safety Data Sheet)
- Know what appropriate safeguards, including personal protective equipment, the chemical or machinery requires.
- Know the location and proper use of emergency equipment.
- Know how and where to properly store the chemical.
- Know the proper method of transporting chemicals within the Art department facility.
- Know the appropriate procedures for emergencies, including evacuation routes, spill cleanup procedures, and proper waste disposal.
Personal Behavior

Behavior in the Art studios can affect everyone's safety. The following Safety Rules apply to all at DPU:

◦ No horseplay in the studios; avoid distracting or startling other workers.
◦ Confine long hair, jewelry and loose clothing.
◦ No eating, smoking, drinking or applying cosmetics in the studios.
◦ Wash promptly with soap and water whenever a chemical has contacted the skin.
◦ Avoid inhalation of chemicals.
◦ Keep your work area clean and uncluttered.
◦ Wash well with soap and water before leaving the studio; do not wash with solvents.
◦ Only students currently registered for a course using a particular studio should be in that studio, in particular outside of class time. Visitors, even if they are DePaul students from other areas, are not allowed in darkroom, printmaking, sculpture studios, painting studios or any of the computer labs.
◦ Do not prop doors open in the studios! Not only does this compromise everyone's safety (especially after hours) but it also undermines the separate ventilation system the studio areas have.

Housekeeping

◦ Clearly label containers with chemical name, your initials, date, and special hazards associated with that chemical. Use pre-printed labels where available. (rooms 334, 333) Do not leave unlabeled containers out---even when they are just water.
◦ Do not use any cracked or chipped glassware.
◦ Keep all work areas clear of clutter.
◦ Keep all aisles, hallways, and stairs clear of all chemicals.
◦ Access to emergency equipment, showers, eyewashes, and exits should never be blocked.
◦ All chemicals should be placed in their assigned storage area at the end of each workday.
◦ Wastes should be properly labeled and kept in their proper containers.
◦ Promptly clean up all spills. Pay special attention to common areas.

3. Chemical Safety Principals and Concepts

The hazards of chemicals vary widely and appropriate caution must always be used. Every chemical can be hazardous in certain circumstances. For example, even water can be a serious health hazard under certain conditions and when the proper personal protective equipment is not used (e.g. drowning). An understanding of the hazards of chemicals and how they enter the body can help those working with chemicals devise procedures to work with them safely.

Routes of Exposure

There are three major routes of entry for a chemical to enter the body: inhalation; direct contact (to skin and eyes); and ingestion. Injection is a fourth, though much less common, route of entry for chemicals. An understanding of these routes of entries enables one to develop procedures or controls to prevent hazardous exposures to chemicals.

◦ Inhalation hazards: Inhalation of chemicals is the most common route of entry a chemical can take to enter the body.
Direct (skin/eye) contact hazards: Many chemicals (e.g. corrosives) can injure the skin directly, while others may cause irritation or an allergic reaction.

Ingestion hazards: Persons using chemicals can easily ingest chemicals into the body via contaminated hands if they are not washed prior to eating, drinking, smoking, applying cosmetics, or sticking part of the hand, paintbrush or other implement that has become contaminated into the mouth.

Injection hazards: This route is the least likely for chemical exposures. Accidental injection of chemicals through needles is unlikely.

Controlling Chemical Exposures
Control techniques fall into three broad classes in order of preference: engineering controls, administrative controls, and personal protective equipment.

Engineering controls: Conducting work with hazardous chemicals in a fume hood or glove box, and providing secondary containment in the event of spills are examples of engineering controls.

Administrative controls: Examples of administrative controls are posting hazard signs on laboratory doors, minimizing exposure time when working with hazardous chemicals.

Personal protective equipment: Personal protective equipment includes items such as gloves, eye protection, suitable clothing, and respirators. Because such equipment is the last line of defense against exposure to hazardous chemicals, these are the options last employed.

4. Chemical Procurement, Distribution, and Storage

Inventory

All chemicals received are to be unpacked in the storage area or studio. Each chemical is entered into the departments Chemical Inventory System. The name, amount, date received, and location in the stockroom are recorded. Amounts used should be recorded as they are used. Each chemical should arrive with a Material Safety Data Sheet.

Labeling

Required information on labels includes:

- The name of the material.
- An appropriate hazard warning.
- The target organ effect.

Labels are displayed for the life of the container:

- Labels are not to be removed or defaced when received or in use.
- Check to insure that labels are legible and affixed.
- Make sure the label information is current.
- If the label is destroyed, immediately mark the container with required information.

Portable containers into which hazardous chemicals are transferred from labeled containers and intended for immediate use must be labeled with the product name and hazard.
Storage

- Stored chemicals are be examined annually by the Studio Manager for replacement, deterioration, and container integrity.
- Flammable liquids are stored in Flammable Cabinets. (Located in rooms 329, 333, 334, 337) Never in lockers!
- Acids are stored in the acid cabinets. (Located in room 333.)
- Studio Storage - Amounts permitted should be as small as practical. Exposure to heat or direct sunlight should be avoided. Periodic inventories should be conducted, with unneeded items being discarded.

Distribution

- Chemicals distributed from the stockroom should be moved on carts. Large amounts of chemicals should be moved in a basin or tray to contain any spill.
- Acids and solvents of 500 ml or more should be moved in a rubber pail.
- If chemicals are being transported in the elevator, only the Studio manager should accompany them - no other people should ride in the elevator at the same time.

5. Housekeeping, Maintenance and Inspections

Cleaning

Floors should be cleaned regularly.

Inspections

Informal inspections shall be carried out continually in order to correct any deficiencies as quickly as possible.

Maintenance

Eye wash stations will be inspected at intervals of not less than 3 months by the Studio Manager. Safety showers will be tested annually by Facilities Operations personnel. Fire extinguishers will be inspected monthly by Facilities Operations personnel.

Fume hoods will undergo regular inspection and maintenance by Facilities Operations personnel to assure adequate hood performance.

Passageways

Stairways and hallways should not be used as storage areas. Access to exits, emergency equipment, and utility controls should never be blocked.

6. Emergency Procedures

Emergency Assistance

All accidents and emergency situations must be reported to the Public Safety Office personnel and a report filed. All incidents related to the use of chemicals must also have an INCIDENT REPORT FORM filed with the EH&S Office.
Call 5-7777, Public Safety for assistance in the following kinds of emergencies:

- medical assistance for injuries
- fires
- explosions
- chemical spills for which assistance is required
- Public Safety will dispatch the Fire Department and/or ambulances as appropriate.

When calling Public safety, you should be ready to provide the following information:

- What is the name of the chemical spilled?
- What quantity of the chemical is spilled?
- Where is the spill (building name and room number)?
- Is anyone injured or splashed with the chemical?
- Is a fire or explosion involved in the spill?
- What is your name and phone number?

Spill Preparedness

Small chemical spills in the Art studio can be safely cleaned up by those who spilled the material. If handled properly, these small spills are little more than a minor nuisances. On the other hand, some spills should be cleaned up only by specially trained emergency response personnel.

Preventing spills

Listed below are some basic spill prevention steps that apply to storage, transportation, and transfer of chemicals.

General precautions:

- reduce clutter and unnecessary materials in your work areas
- eliminate tripping hazards and other obstructions
- have all needed equipment readily available before starting work

Storage precautions:

- larger containers should be stored closer to the floor
- use appropriate storage containers
- do not store unprotected glass containers on the floor

Transportation precautions:

- use carts, where appropriate
- use safety containers, where appropriate
- think about potential hazards before transporting chemicals

Precautions in transferring chemicals:

- pay careful attention to the size of container to avoid overfilling
- use pumps, funnels or other mechanical devices rather than simple pouring
- provide containment to capture leaks and spills
Spill control kits

Spill control materials should be available at all times. You may buy prepackaged spill kits from various vendors.

Because prepackaged kits tend to be expensive, many chemical users prefer to make their own kits. Should you decide to make your own kit, include the following at a minimum:

- Disposable (nitrile or latex) gloves (1 box)
- Neoprene gloves (1 set)
- Safety goggles (vent less preferred)
- Poly scoop
- Poly dustpan
- Plastic bags
- Absorbent material
- 3M Chemical Sorbent or similar material, or 1:1:1 mixture of sand, soda ash, and kitty litter
- 5-gallon poly (plastic) pail

The location of spill control kits should be clearly marked and highly visible. Make sure all personnel know the location of the kit, are familiar with the contents of the kit, and understand the limitations of the kit.

Defining and classifying a spill

Chemical spills can be broken down into two basic subtypes: simple spills, which you can clean up yourself, and complicated spills, which require outside assistance.

If your spill meets ANY of the following conditions of a complicated spill, call 9-911, and Public Safety immediately. Public Safety will call RM & EHS; RM & EHS will contact our Environmental Emergency Response team to clean up the chemical spill.

A spill is complicated if:

- a person is injured
- identity of the chemical is unknown
- multiple chemicals are involved
- the chemical is highly toxic, flammable or reactive
- the spill occurs in a “public space” such as corridors
- the spill has the potential to spread to other parts of the building such as through the ventilation system
- the clean up procedures are not known or appropriate materials are not readily available
- the spill may endanger the environment such as reaching waterways or outside ground

If none of the above are met, the spill is defined as simple. You may clean up simple spills.

7. Personal Protective Equipment and Personal Hygiene

Wearing appropriate personal protective equipment and practicing good personal hygiene as described below will minimize exposures to hazardous chemicals during routine use and in the event of an accident.
Attire: Wear a long sleeved shirt. Cover legs (no shorts or short skirts) skirts below the knee is acceptable and feet (no sandals or open-toed shoes) confine loose clothing and long hair. Nylons and/or pantyhose are not recommended because they may melt upon contact with acid.

Eye protection: Wear ANSI approved splash guard safety glasses (or goggles) in the Art studio when using chemicals.

Gloves: Gloves are essential when working with hazardous substances. The proper gloves will prevent skin absorption, infection or burns. Glove materials vary in effectiveness in protecting against chemical hazards. Always check the chemicals MSDS, the MSDS will tell you what type of glove you should wear.

Personal hygiene: Hands should be washed frequently throughout the day, after glove removal, before leaving the studio, after contact with any hazardous material, and before eating, drinking, smoking, or applying cosmetics.

8. Signs and Labels

Prominent signs and labels of the following types should be posted:

- Emergency telephone numbers of emergency personnel/facilities, supervisors, and Studio manager.
- Identity labels, showing contents of containers (including waste receptacles) associated hazards.
- Location signs for safety showers, eyewash stations, other safety and first aid equipment, exits and areas where food and beverage consumption and storage permitted.
- Warnings at areas or equipment where special or unusual hazards exist.

9. Training

The Risk Management and Environmental Health and Safety (RM &EHS) provides on line Safety training for the university community. The Safety training that is offered is designed to cover, in a general way, many of the topics required by the OSHA Art Studio Standard. This training, however, is not intended to be the sole means of training workers but must be supplemented by additional safety instruction from the professors and/or Studio Manager on the potential hazards associated with an individual's specific duties. This individualized training should include a review of the studio's safety features and equipment.

10. Waste Disposal

Much of the waste generated by the Art Department is considered hazardous waste by the US Environmental Protection Agency and requires special handling. These materials may not be poured down the drain. Waste containers are located in each of the studios for collecting hazardous waste. Each year, DPU hires a hazardous waste disposal company to properly dispose of the collected waste for both art and science.

Types of Wastes

There are several types of wastes that can be generated in Art. Some examples include:

- Oily rags.
- Solvent wastes (turpentine, paint thinner, etc.).
- Paints, Baby oil, Linseed oil, Ceramic glaze.
- Photographic chemicals.
- Acids and bases.
- Sharp implements.
- Lubricating oil.
- Empty chemical containers.
Proper Handling of Waste

Oily rags must be placed in a red oily rag can. The rags are emptied out each night by the custodial staff. Do not leave oily rags lying around the floor. Linseed oil, in particular, can ignite on its own if left out, causing fire that may spread to other areas. The oily rag can is self-closing to prevent such an occurrence.

Solvents, such as paint thinner, turpentine, and alcohols are considered hazardous waste. DO NOT DUMP them down the drain. Put them in the waste container in the studio. If the waste container is full or nearly full, please inform the studio manager.

Oil-based paints are considered hazardous waste. DO NOT dump oil-based paint down the drain or place in regular trash. Oil-based paints may be combined with solvents and linseed oil for disposal. Follow the instructions for handling hazardous wastes. Latex paints should be dried out and placed in regular trash. Water-based paints may be disposed via the regular trash.

Baby oil is not considered hazardous waste. Baby oil can be used to clean brushes and can be washed down the drain. Excess baby oil can be disposed in the regular trash.

Because of its potential for fire, linseed oil should be handled as a hazardous waste, in a similar manner as solvents. Linseed oil can be combined with oil-based paints and solvents for disposal.

Photographic chemicals generally fit into four categories: fixers, developers, rinses, and specialized chemicals.

Materials with a pH of less than 2 or more than 12.5 are considered hazardous waste. Do not mix these wastes with the solvent or oil wastes. Use care when handling acids and bases and follow the instructions for handling hazardous waste.

Sharp objects, such as razor blades, knives, and broken glass should be disposed of in the broken glass cardboard container in each studio. They should not be put in the regular trash. Proper disposal of sharp objects helps to avoid injury to janitors or others handling the trash.

Empty chemical containers should be defaced and disposed of in the regular trash.

11. Painting and Drawing

Pigments, solvents, preservatives, and aerosol sprays are all sources of possible hazardous materials in the painting studio.

Pigments are especially hazardous if they are used in their powder form, because of the risk of inhaling the powder while mixing the paint, so most paints are purchased as ready to use. Most artists are aware of the dangers of lead pigments, but many do not realize that other pigments can be toxic as well. See Appendix A for a list of the more hazardous pigments.

Solvents used in painting pose an inhalation hazard. Thinners, methyl alcohol, and lacquers are also hazardous by skin contact and ingestion. Good ventilation is required when using solvents. Some solvents are absorbed through the skin, so always wear gloves when handling solvents.

Spray painting and the use of aerosol cans is highly hazardous by inhalation. Spray guns, airbrushes, and aerosol spray cans all produce a very fine particulate mist that is easily inhaled and can remain suspended in the air for up to 2 hours, long after the solvent vapors have dissipated. The hazards from the spray mist include toxic pigments, solvents, and propellants.
Acrylics. When using water based acrylic emulsion, be aware that they contain small amounts of ammonia and formaldehyde. This may cause some irritation of the eyes, nose, and throat if used without ventilation. The formaldehyde may cause allergic reactions in people who are already sensitized to formaldehyde.

Drawing Materials

• Most common dry drawing materials (pencil, chalk, charcoal, graphite, oil pastels) are not considered hazardous, although you do not want to inhale large amounts of any dust. The habit of blowing dust off a drawing can result in inhaling large amounts of dust. Pastels can be more hazardous as they may contain toxic pigments, just like paints.

• The use of spray fixatives to protect drawings is an inhalation hazard, especially because of the presence of toxic solvents. They should be used outdoors or in a spray booth.

• Permanent makers contain solvents, usually xylene or alcohols. There have been cases of liver damage from using xylene based markers in a poorly ventilated space. The alcohol based markers are safer. The major hazard from using permanent markers results from using a number of them at the same time at close range.

• Solvent based drawing inks and permanent markers should be used with good dilution ventilation (e.g. window exhaust fan).

• Never paint on the body with markers or drawing inks. Body painting should be done with cosmetic colors.

Good Practices

• Use paints that are less toxic. Obtain Material Data Safety Sheets for all paints, so that you can be sure what pigments are present.

• Avoid mixing powdered pigments.

• Do not eat, drink, or smoke in the studio. Wash your hands carefully after work, including under the fingernails.

• Do not point your paintbrush with your lips.

• Whenever possible, replace turpentine with the less toxic and less flammable turpenoid or odorless paint mineral spirits.

• Wear gloves when using varnishes, lacquers, lacquer thinners, and paint removers.

• Store all flammables in the flammable cabinet in the studio.

• Make sure you have adequate ventilation.

• Oil paint can be removed from hands with baby oil and then soap and water. A safe waterless hand cleanser can also be used. Do not use turpentine to clean hands.

• Wear nitrile or neoprene gloves when cleaning brushes with solvents.
• Always spray or airbrush in a spray booth. Watch for and eliminate all sources of ignition. When finished with the spray booth, leave the doors shut and the exhaust fan on for 15 minutes to remove fumes.

• Do not blow excess dust off a drawing. Tap the drawing and allow the dust to fall, then clean up by wiping counter with wet rag and wet mopping the floor.

• Always use spray fixatives in a spray booth or outdoors.

Waste Handling

• Do not pour solvents or waste oil paint down the sink. Pour solvent and paint waste into the waste containers are provided in the studios.

• Keep waste containers and all containers of solvents tightly capped when not in use.

• All rags used with solvents such as linseed oil or mineral spirits should be put in the oily waste can at the end of each day.

12. Ceramics

Clay/Plaster

• Inhalation of large amounts of free silica could possibly cause silicosis, or 'potter's rot', after years of exposure.

Do not pour any plaster, clay or water containing significant amounts of either clay or plaster down the sink! Instead, let the bucket sit (sometimes for a day or two) until the water on top is clear—pour that down the sink and let the clay/plaster residue dry up enough to be thrown out in the garbage.

• Respiratory problems, such as hypersensitivity pneumonia and asthma, can result from molds that grow when clay is soured or aged in a damp place, or when clay slips stand for months.

• Reconditioning clay or grog by pulverizing it can create very high concentrations of hazardous silica dust.

Good Practices

• Avoid generating dust when mixing clay. Use an area that has good ventilation and scoop out the clay – do not dump the powdered clay into the mixer.

• Wet mop the studio floor, or wet floor and use wet vacuum to clean up the dust.

13. Photography

Black and White Photographic Processing

• A variety of chemicals are used in black-and-white film processing, each with its own level of hazard. Minimizing exposure to these chemicals is the best way to protect yourself when doing photographic processing.
• Developers cause some of the most common health problems in photography. Mixing powdered developer solution presents a hazard because the dust can be inhaled and many of the chemicals used in developers can cause severe skin reactions, eye injury, mutations in developing fetuses, and poisoning.

• Concentrated solutions must be handled carefully: concentrated developer solutions have the same hazards as the powdered developers and they are also caustic and can cause severe burns. Concentrated acids are corrosive to skin, eyes, and lungs and can also cause severe burns.

• Some gases and vapors generated in the photography dark room are hazardous. Sulfur dioxide, which is highly toxic by inhalation, can be generated if acetic acid from the stop bath is transferred to the fixing bath. Continual inhalation of acetic acid vapors, even from the stop bath, may cause bronchitis.

**Good Practices**

• Purchase photo chemicals in liquid form to reduce exposure to powdered chemicals. Pregnant women, in particular, should not be exposed to powdered developer.

• Wear gloves, goggles, and protective apron when mixing concentrated photo chemicals, including developers for both black and white processing and color processing.

• Always add glacial acetic acid to water, never the reverse.

• Store concentrated acids in the acid cabinet.

• Label all solutions carefully.

• Do not store photographic solutions in glass containers.

• Do not put your bare hands in developer baths. Wear gloves and use tongs to manipulate developing photographs.

• If developer solution splashes on your skin or eyes, immediately rinse with lots of water.

• All darkrooms require good ventilation to control the level of acetic acid vapors and sulfur dioxide gas produced. Make sure you turn the exhaust fan on before using either darkroom.

• Cover all baths when not in use to prevent evaporation or release of toxic vapors.

• Do not use cyanide, or cyanide reducers because of their high toxicity.

• Take precautions to make sure that sulfide or selenium toners are not contaminated with acids. When using two bath sulfide toners, make sure you rinse the print well after bleaching in acid before dipping it in the sulfide developer.

• Handle cleaning acids with care: wear gloves, eye protection. Make sure that acid is always added to water when diluting.

• Keep potassium persulfate away from flammable substances.
• Control the temperature carefully according to manufacturer’s recommendations to reduce emissions of toxic vapors.

• Airbrushing should only be done in a spray booth.

• Do not point brushes or wet pencils with lips.

See Appendix B for a list of Hazards of Photographic Chemicals

14. Printmaking

Hazards

There are two basic printmaking techniques: intaglio, and relief. The use of ink and solvents are common to all of them. The chart in this section lists some of the specific hazards of various chemicals for each method of printmaking. Exposure to the chemicals in inks, solvents, and acids is a major source of the hazards associated with printmaking. Physical hazards in printmaking are present because of the use of printing presses and sharp tools.

Inks

• Inorganic and organic pigments pose a hazard due to accidental ingestion during use. Chronic exposure to these toxic pigments can cause harm.

• Examples of toxic pigments found in ink are: compounds of cadmium, cobalt, manganese, and mercury, chrome yellow, zinc yellow, strontium yellow, and cadmium pigments.

• Inhalation of powdered pigment is especially hazardous, so mixing powdered pigment should be avoided. If necessary, mixing should be done in a glove box with adequate ventilation.

Solvents

• Many solvents used in printmaking are hazardous by inhalation and ingestion. Toluene and chlorinated hydrocarbons are especially hazardous. Alcohols are less hazardous.

• Obtain MSDS for the solvents used in the studio so that adequate precautions can be taken.

• Many solvents can be absorbed directly through the skin. Consult the glove chart to determine which gloves should be worn when using solvents.

• Never wash hands with solvents.

• Most solvents are flammable or combustible.

• Store all solvents in the flammable safety cabinet.

Acid Solutions

• Concentrated acids are extremely hazardous to skin and eyes. Always wear gloves, goggles, and an apron when handling concentrated acids.
• Always add acid to water when preparing an acid solution – this avoids having the acid splash up into your face.

• Etching metal plates with nitric acid produces nitrogen dioxide, which is a hazardous gas. Avoid breathing this gas – use adequate ventilation.

Caustic substances

• Caustic substances are very strong bases such as caustic soda (sodium hydroxide) and are very corrosive to skin and eyes.

• Always wear gloves, goggles, and an apron when handling concentrated solutions or powders of caustic material.

• If you get a caustic substance on your skin, it may not burn, but feel slippery. However, it will cause damage to your skin if it’s not washed off immediately. Eye damage with caustic substances is even more extensive than with acids.

Good Practices

• Use water based relief printing inks whenever possible to avoid use of solvents for cleanup.

• Avoid getting ink in cuts and sores when using hand wiping techniques by wearing gloves

• Do not eat, drink, or apply makeup in the studio or touch face with hands to prevent transferring ink from hands to mouth.

• Wash hands carefully and often with soap and water. Do not wait until the ink dries on your hands. Baby oil or vegetable oil, and then soap and water will remove inks from the skin.

• All presses should have safety guards to prevent hands or fingers getting trapped. Bind up long hair; do not wear loose sleeves or necklaces.

• Minimize solvent use by cleaning excess ink off inking slabs with safety edged razor blades before cleaning residue with solvents.

• Store flammable and combustible solvents in flammable cabinet. Dispose of solvent soaked rags in oily rag can.

• Always wear appropriate gloves when using solvents.

• Use adequate ventilation – cleaning plates and rollers and other processes that require large amounts of solvents should be done in a fume hood or in front of a slot exhaust hood.

• Store solvent soaked rags in the oily waste can.

• Wear gloves, goggles, and protective apron when handling all concentrated acids to avoid skin and eye contact

• When diluting concentrated acids, always add the acid slowly to the water, never the reverse.
• Use the least hazardous substances you can – for example, substitute baby powder for French
talc and substitute ferric chloride for the more hazardous Dutch mordant.

• Wear gloves, goggles, and apron when handling alkaline solutions such as plate conditioners
and caustic soda.

• Store concentrated nitric acid separately from other chemicals.

• Avoid breathing the brown gas (nitrogen dioxide) given off during etching with nitric acid.

• Cover acid baths when not in use

Waste procedures

• All solvent waste should be collected in the waste containers provided – do not pour solvent
waste down the drain.

• All solvent soaked rags and newspapers should be put in the oily waste can.

• Acid solutions from etching procedures should be poured into the acid waste

See APPENDIX C for Hazards of Substances in Printmaking

15. Wood shop

All users of the woodshop must have gone through shop orientation once during the academic
year and have a signed user agreement on file with the Studio Manager prior to working in the
woodshop.

General Shop Safety

• Eye protection must be worn in the shop.
• Covered shoes must be worn in the shop. No open-toes, sandals or flip-flops.
• Do not work alone in the shop. Shop staff or faculty must be present
• NO FOOD OR DRINK are allowed in the woodshop.
• Clean up before you leave. This means your workspace and also tools, please.
• Replace tools in the tool room. Remove bits from drills and coil cords neatly. Ask if you
are not sure where something goes.
• Do not force tools! If a tool does not work without force, or is making an unusual sound,
notify shop staff or faculty immediately.
• Know the tool you are working with before attempting to use it. Ask Shop Supervisor for
instruction before proceeding.
• NEVER ASSUME A TOOL IS PROPERLY ADJUSTED. Always check the tool prior to
use.
• COURTEOUS BEHAVIOR IS A SAFETY OBLIGATION. Please notify anyone standing
near a tool before you turn it on. By working in this woodshop you grant the shop
attendant, department staff and/or faculty the right to deny admittance if your behavior is
deemed unsafe.
• IN CASE OF INJURY, STOP WORK and notify the shop attendant or faculty
immediately. Even a small injury can cause you to go into shock. Immediately
seek treatment of major injuries and call 5-7777, Public Safety. A first aid kit is
provided to treat minor injuries. If you are in the shop when someone is injured,
you must stop working and assist him or her, but you must be trained to provide first aid.

**NO TOOL CHECK OUT! TOOLS MAY NOT LEAVE THE WOODSHOP!**

**Use of wood shop (room 337)**

- Woodshop is to be used ONLY by currently registered Department of Art, Media and Design students, staff and faculty. Students are permitted in the woodshop only when working on an assigned project. Allow others to work safely and effectively by taking non-shop activities out of the woodshop.
- **HOURS OF OPERATION:** Users may work in the woodshop only during class hours and/or during studio hours; or when accompanied by and under the supervision of the Studio Manager or a trained faculty member. You may work in the adjacent classroom (335) during building hours, when it is not occupied by a class, but not in the shop itself.
- Store wood in the bins by double outside doors. Make sure you put your name and the quarter/year (e.g. "McStudent SPG/08") on the edge of the wood that is visible so no one else uses it. Conversely, please check any wood you want to use for marking like this before using it. The woodshop does provide some other materials, such as basic fasteners, glue and sandpaper. If your project requires specific hardware or materials you are responsible for providing it.
- Do not store projects in the shop area, including ongoing projects.
- Do not paint, spray or use chemicals in the woodshop. Woodshop is for wood working only. Wood finishing must be done outside the woodshop in an appropriately ventilated area. (adjacent room 335 for water-based or spray booth in 333 for oil-based)
- Do not glue in the woodshop without first putting down paper to catch spilled glue. Do NOT glue on top of machinery or wood benches. Use glues sparingly – a little works best.
- All users are responsible for replacement of broken components.

**16. Digital Labs**

- Food and drink are not allowed in the digital lab. Crumbs and liquids do not mix with keyboards and other delicate electronics.
- Use only the power sources provided by the lab. Extension cords and power strips brought in from the outside are prohibited.

**Ergonomics**

To avoid potential physical problems when using computers, follow these suggestions:

- When you use a keyboard and mouse or track pad, your shoulders should be relaxed. Your upper arm and forearm should form an angle that is slightly greater than a right angle, with your wrists and hands in roughly a straight line.
- Use a light touch, and keep your hands and fingers relaxed. Do not allow your thumbs to roll under your palms. Do not rest your forearms on a hard surface: this can lead to carpal tunnel syndrome. Use a gel pad under your wrist.
- Change hand positions often to avoid fatigue. Take frequent short breaks (get up and walk around) to avoid discomfort or injury to your hands, wrists, arms, back, or neck. If you begin to develop chronic pain in any of these areas, seek medical advice.
- Use an adjustable chair, and adjust it so your thighs are horizontal and feet flat on the floor. The back of the chair should support your lower back—the lumbar spine. If you have to raise the chair so your forearms and hands are at the proper angle but your feet are no longer flat on the floor, get an adjustable footrest.
- If you use a mouse, position it at the same height as the keyboard and within a comfortable reach. Do not overreach.
- Adjust the display angle to minimize glare and reflections. The plane of the display should be parallel to the plane of your face, when your head is held in a relaxed position. Avoid
having to look up at the display: If you find yourself getting a stiff neck, you are holding your head incorrectly.

17. Arc Welding

To be able to weld using safe practices and to know what personal protective equipment should be used. Arc welding includes shielded metal-arc, gas shielded and resistance welding. Since arc welding equipment varies in size and type, it is important to read and follow the manufacturer's recommendations.

General Arc Welding Safety:

- Before starting any arc welding operation, a complete inspection of the welder should be made.
- Read all warning labels and instructions manuals.
- Remove all potential fire hazards from the welding area.
- Always have a fire extinguisher ready for immediate use.
- Equip welding machines with power disconnect switches which can be shut off quickly.
- The power to the machine should be disconnected before making repairs.
- Proper grounding of welding machines is essential.
- Electrode holders should not be used if they have loose cable connections, defective jaws, or poor insulation.
- An arc should not be struck if someone without proper eye protection is nearby.

Personal Protective Equipment:

- Infrared radiation is a cause of retinal burning and cataracts. Protect your eyes and face with a welding helmet properly fitted and with the proper grade of filter plate.
- Protect your body from welding spatter and arc flash with protective clothing. Such as:
  - Woolen clothing
  - Flame-proof apron
  - Gloves
  - Properly fitted clothing that is not frayed or worn.
  - Shirts should have long sleeves.
  - Trousers should be straight-legged and covering shoes when arc welding.
  - Fire resistant cape or shoulder covers are needed for overhead work.

- Check protective clothing equipment before each use to make sure it is in good condition.
- Keep clothes free of grease and oil.

Proper Ventilation

Be sure there is adequate ventilation available when welding in confined areas or where there are barriers to air movement. Natural drafts, fans and positioning of the head can help keep fumes away from the welder's face.

Ventilation is sufficient if:

- The room or welding area contains at least 10,000 cubic feet for each welder.
- The ceiling height is not less than 16 feet.
- Cross ventilation is not blocked by partitions, equipment, or other structural barriers.
- Welding is not done in a confined space.
Avoiding Electrical Shock

Electrical shock can kill. To prevent electrical shock:

- Use well insulated electrode holders and cables.
- Make sure welding cables are dry and free of grease and oil.
- Keep welding cables away from power supply cables.
- Wear dry hole-free gloves.
- Clothing should also be dry.
- Insulate the welder from the ground by using dry insulation, such as a rubber mat or dry wood.
- Ground frames of welding units.
- Never change electrodes with bare hands or wet gloves.
**APPENDIX A: Known or Probable Carcinogens/Highly Toxic Pigments**

- Antimony white (antimony trioxide)
- Barium yellow (barium chromate)
- Burnt umber or raw umber (iron oxides, manganese silicates or dioxide)
- Cadmium red or orange (cadmium sulfide, cadmium selenide)
- Cadmium yellow (cadmium sulfide)
- Cadmium barium colors (cadmium sulfide, cadmium selenide, barium sulfate, zinc sulfide)
- Chrome green (Prussian blue, lead chromate)
- Chrome orange (basic lead carbonate)
- Chrome yellow (lead chromate)
- Cobalt violet (cobalt arsenate or cobalt phosphate)
- Cobalt yellow (potassium cobalt nitrate)
- Lead or flake white (basic lead carbonate)
- Lithol red (sodium, barium and calcium salts of soluble azo pigment)
- Manganese violet (manganese ammonium pyrophosphate)
- Molybdate orange (lead chromate, lead molybdate, lead sulfate)
- Naples yellow (lead antimonite)
- Strontium yellow (strontium chromate)
- Vermilion (mercuric sulfide)
- Zinc sulfide
- Zinc yellow (zinc chromate)

**Moderately Toxic Pigments/Slightly Toxic Pigments**

- Alizarin crimson (1, 2-dihydroxyanthraquinone or insoluble anthraquinone pigment)
- Carbon black (carbon)
- Cerulean blue (cobalt stannate)
• Cobalt blue (cobalt stannate)
• Cobalt green (calcined cobalt, zinc and aluminum oxides)
• Chromium oxide green (chromic oxide)
• Manganese blue (barium manganate, barium sulfate)
• Prussian blue (ferric ferrocyanide)
• Toluidine red or Toluidine yellow (insoluble azo pigment)
• Viridian (hydrated chromic acid)
• Zinc white (zinc oxide)

• Other pigments besides those containing heavy metals can be hazardous. Lampblack, for instance, can cause skin cancer. Also, the toxicity of many of the modern synthetic organic pigments is unknown.

• Quicklime, used as a binder in paints, is both a skin and lung irritant and, if inhaled, may cause chemical pneumonia.

APPENDIX B: HAZARDS OF PHOTOGRAPHIC CHEMICALS

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al  u m</td>
<td>Slightly toxic</td>
</tr>
<tr>
<td>Boric acid</td>
<td>Moderately toxic by ingestion or inhalation.</td>
</tr>
<tr>
<td>Catechol</td>
<td>Causes severe poisoning; can be absorbed through skin</td>
</tr>
<tr>
<td>Concentrated hydrochloric acid</td>
<td>Corrosive; diluted acid is a skin and eye irritant</td>
</tr>
<tr>
<td>Developer Powders</td>
<td>Highly toxic by inhalation, may cause acute anemia (methemoglobinemia)</td>
</tr>
<tr>
<td>Ethylene diamine</td>
<td>Strong sensitizer; skin and respiratory irritant</td>
</tr>
<tr>
<td>Ferric ammonium citrate</td>
<td>Moderately toxic by ingestion; slightly toxic by skin contact and inhalation</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>Highly toxic by inhalation and ingestion; moderately toxic by skin contact.</td>
</tr>
<tr>
<td>Chemical Name</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Glacial Acetic Acid</td>
<td>Highly corrosive by skin contact, ingestion, and inhalation. Highly toxic by inhalation, skin contact, and ingestion</td>
</tr>
<tr>
<td>Hydroquinone</td>
<td>Highly toxic by ingestion. Can cause depigmentation and eye injury after 5 or more years of repeated exposure; mutagen.</td>
</tr>
<tr>
<td>Hydroxylamine sulfate</td>
<td>Suspected teratogen (causes birth defects). Skin and eye irritant.</td>
</tr>
<tr>
<td>Hypochlorite bleaches</td>
<td>Can release highly toxic chlorine gas when acid is added or if heated</td>
</tr>
<tr>
<td>Mercury compounds</td>
<td>Highly toxic by skin contact; may be absorbed through the skin. Also highly toxic by inhalation and ingestion</td>
</tr>
<tr>
<td>Monomethyl-paminophenol sulfate</td>
<td>Highly toxic by ingestion. Skin and eye irritant, strong sensitizer.</td>
</tr>
<tr>
<td>P-phenylene diamine</td>
<td>Highly toxic by skin contact, inhalation, and ingestion. Cause severe skin allergies and can be absorbed through the skin.</td>
</tr>
<tr>
<td>Phenidone</td>
<td>Slightly toxic by skin contact</td>
</tr>
<tr>
<td>Potassium bromide</td>
<td>Moderately toxic by inhalation or ingestion. Can cause bromide poisoning in fetuses of pregnant women experiencing high exposure.</td>
</tr>
<tr>
<td>Potassium chlorochromate</td>
<td>Probable human carcinogen, can release highly toxic chlorine gas if heated or if acid is added</td>
</tr>
<tr>
<td>Potassium chrome alum (chrome alum)</td>
<td>Highly toxic by skin contact and inhalation</td>
</tr>
<tr>
<td>Potassium dichromate</td>
<td>Probable human carcinogen</td>
</tr>
<tr>
<td>Potassium ferricyanide(Farmer's reducer)</td>
<td>Only slightly toxic, however will release hydrogen cyanide gas (highly toxic) if heated or if hot acid is added.</td>
</tr>
<tr>
<td>Potassium permanganate</td>
<td>May cause fires or explosions in contact with solvents</td>
</tr>
<tr>
<td>Potassium persulfate</td>
<td>May cause fires or explosions in contact with solvents. Skin and eye irritants</td>
</tr>
<tr>
<td>Pyrocatechol</td>
<td>Highly toxic by ingestion.</td>
</tr>
<tr>
<td>Pyrogallic acid</td>
<td>Causes severe poisoning; can be absorbed through skin. Selenium Skin and eye irritant; can cause kidney damage. Treatment of selenium salts with acid may release highly toxic hydrogen selenide gas.</td>
</tr>
</tbody>
</table>
Silver nitrate      Moderately corrosive by skin contact or inhalation; highly toxic by ingestion. Eye damage can be very serious
Sodium carbonate   Highly corrosive by skin contact or ingestion
Sodium hydroxide   Highly corrosive by skin contact or ingestion
Sodium or potassium cyanide   Extremely toxic by inhalation and ingestion
Sodium potassium tartrate   Moderately toxic by ingestion; slightly toxic by skin contact and inhalation
Sodium sulfite      Moderately toxic by ingestion or inhalation.
Sodium thiosulfate   Not significantly toxic by skin contact. Can decompose to form highly toxic (by inhalation) sulfur dioxide vapors. Moderately toxic by inhalation and ingestion.
Sodium/potassium sulfide   Can release highly toxic hydrogen sulfide gas when treated with acid

APPENDIX C: HAZARDS OF SUBSTANCES USED IN PRINTMAKING

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acids, concentrated</td>
<td>Can cause severe skin burns and eye damage from splashes</td>
</tr>
<tr>
<td>Acid solutions: acetic acid, Nitric acid, hydrochloric acid, Phosphoric acid, tannic acid</td>
<td>Strong skin and eye irritants</td>
</tr>
<tr>
<td>Antiskinning agents, aerosole types</td>
<td>Highly toxic by inhalation</td>
</tr>
<tr>
<td>Aluminum stearate</td>
<td>Skin, eye, and respiratory irritant. Inhalation of large amount can cause chemical pneumonia.</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Skin irritant, highly toxic by inhalation</td>
</tr>
<tr>
<td>Ammonium dichromate</td>
<td>Probable human carcinogen Moderately toxic by skin contact Highly toxic by inhalation used with magnesium carbonate</td>
</tr>
<tr>
<td>Benzine</td>
<td>Moderately toxic by skin contact, inhalation, and ingestion</td>
</tr>
<tr>
<td>Benzine</td>
<td>Flammable</td>
</tr>
<tr>
<td>Substance</td>
<td>Hazard Information</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Caustic Soda (sodium hydroxide)</td>
<td>Highly corrosive to skin, eyes, digestive tract</td>
</tr>
<tr>
<td>Cobalt linoleate</td>
<td>Slightly toxic by skin contact</td>
</tr>
<tr>
<td></td>
<td>Moderately toxic by inhalation or ingestion</td>
</tr>
<tr>
<td>Diazo photosensitive emulsions</td>
<td>Eye irritant</td>
</tr>
<tr>
<td>Epoxy inks</td>
<td>Skin and respiratory irritation and allergies</td>
</tr>
<tr>
<td>Eugenol or oil of cloves</td>
<td>Moderately toxic by ingestion</td>
</tr>
<tr>
<td></td>
<td>Skin irritant</td>
</tr>
<tr>
<td>Gasoline</td>
<td>Flammable. May contain highly toxic lead. Compounds which may be absorbed through skin.</td>
</tr>
<tr>
<td>Hydrofluoric acid</td>
<td>Highly toxic by all routes of entry</td>
</tr>
<tr>
<td></td>
<td>Can cause severe, deep skin burns with no immediate pain warning</td>
</tr>
<tr>
<td>Kerosene</td>
<td>Flammable. Moderately toxic by skin contact, inhalation, and ingestion</td>
</tr>
<tr>
<td>Lamp black</td>
<td>Probable human carcinogen</td>
</tr>
<tr>
<td></td>
<td>Moderately toxic by skin contact</td>
</tr>
<tr>
<td>Lead and manganese driers</td>
<td>Highly toxic by inhalation or ingestion</td>
</tr>
<tr>
<td>Lindseed oil</td>
<td>Flammable – soaked rags may spontaneously Combust.</td>
</tr>
<tr>
<td>Lithotine</td>
<td>Flammable. Moderately toxic by skin contact, inhalation, and ingestion</td>
</tr>
<tr>
<td>Magnesium carbonate</td>
<td>Not significantly toxic</td>
</tr>
<tr>
<td>Mineral spirits</td>
<td>Flammable. Moderately toxic by skin contact, inhalation, and ingestion</td>
</tr>
<tr>
<td>Nitrogen dioxide produced by nitric acid etching procedures</td>
<td>Acute inhalation may cause chemical pneumonia, chronic inhalation causes emphysema.</td>
</tr>
<tr>
<td>Petroleum napthol</td>
<td>Flammable. Moderately toxic by skin contact, inhalation, and ingestion</td>
</tr>
<tr>
<td>Phenol</td>
<td>Highly toxic by both skin absorption and ingestion</td>
</tr>
<tr>
<td>Poster inks with mineral spirits or toluene</td>
<td>Moderately toxic by skin contact and ingestion</td>
</tr>
<tr>
<td></td>
<td>Highly toxic by inhalation if contains toluene</td>
</tr>
<tr>
<td>Substance</td>
<td>Properties</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Potassium chlorate (used in making Dutch mordant)</td>
<td>Skin and respiratory irritant Highly toxic by ingestion Flammable when mixed with solvents and other organics</td>
</tr>
<tr>
<td>Potassium dichromate</td>
<td>Probable human carcinogen Moderately toxic by skin contact Highly</td>
</tr>
<tr>
<td>Saturated caustic potash</td>
<td>Highly corrosive to skin and eyes</td>
</tr>
<tr>
<td>Solvent mixtures for cleaning plates &amp; rollers that contain trichloroethylene, toluene, xylene, or other chlorinated hydrocarbons</td>
<td>Highly toxic by inhalation</td>
</tr>
<tr>
<td>Talc or French chalk</td>
<td>Highly toxic by inhalation Some talcs may contain asbestos-like material</td>
</tr>
<tr>
<td>Vinyl inks</td>
<td>Highly toxic by inhalation</td>
</tr>
<tr>
<td>Vinyl lacquers containing aromatic</td>
<td>Hazardous by inhalation, absorbed directly through the skin</td>
</tr>
<tr>
<td>Hydrocarbons and ketones</td>
<td></td>
</tr>
</tbody>
</table>