PAINTING DEPARTMENT

SAFETY MANUAL AND GUIDELINES

For all emergencies call KCAI Security: 816-931-6666

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Safety in the Studio: The Potential Hazards

Equipment and Tool Hazards

The Painting Department has an array of tools, machinery and equipment available for student use, including an etching press, sewing machines, drills and other tools and technology. Students are required to undergo a safety orientation specific to all equipment before its use, and they should only use this equipment under supervision of their faculty.

ChemicalHazardsAssociatedwithArt Materials

It is imperative that you and your students understand the hazards inherent in the art materials you use such as toxicity, flammability, and reactivity, and the appropriate precautions to protect against illness or injury. Materials that are highly toxic, flammable, or reactive can be handled safely if the proper precautions are followed. However, even materials of low toxicity that are normally considered to be "safe" can lead to accidents and toxic exposures if students ignore appropriate procedures and precautions.

Find Out About the Hazards of the Materials You Are Using

Two good, immediately available sources of health and safety information are: a product's label and its Material Safety Data Sheet (MSDS). As an instructor, you need to be able to teach your students about using these two resources.

Product Labels

Two federal labeling standards apply to art products: the Occupational Safety and Health Administration (OSHA) HazardCommunication Standard and

Labeling of Hazardous Art Materials Act (LHAMA).

Under the OSHA Hazard Communication Standard, hazardous art materials, like other chemical products, must be labeledwith: (1) the common name of the chemical or product; (2) the name, address, and emergency phone number of the company that manufactured the product; and (3) an appropriate hazard warning which may include words such as DANGER, WARNING, or CAUTION are used on less hazardous substances. Most labels provide additional safety information including a list specificpotential hazardous associated withthe material, protective measures tobe used when handling the material,personal protective equipment or clothing that should be worn, first aid instructions, storage information, and procedures to follow in the event of a fire, leak, orspill.

LHAMA amends the Federal Hazardous Substances Act, which required manufactures to evaluate and label consumer products only for acute hazards. LHAMA requiresthat information about chronic or long-term hazards be present as wellon the label of art and craft materials. Manufactures must evaluate their products' ability to cause chronic illness and use label information to warn consumers about those hazards.

The law, which encodes
existing

voluntary standards, was needed because art and craft materials were exempt from consumer lead laws, althoughthey could contain lead and other hazardous substances such as mercury and cadmium not usually allowed in consumer products.

Under LHAMA, all art material labels must include: (1) a statement that the product and its labeling conform to ASTM D-4236. This does not mean that the product is safe, only that following the label's advice should enable the consumer to use the product safely; (2) a list of all potentially hazardous ingredients and signal words such as Caution or Danger (Note: manufacturers may consider some ingredients to be proprietary and therefore are not required to list those specific ingredients even if they are hazardous); (3) chronic hazard statements which inform the user of the kind of harm the product might cause such as, "Cancer Agent", or "Exposure may cause allergic reaction"; (4) precautionary statements which tell the user what actions they must take in order to use the product safely; (5) a manufacturer's telephone number, and (6) a statement that the product is not appropriate for use by children.

Note that materials deemed to be "non-toxic" may also contain chemicals for which there are no chronic toxicity data. Use all art products with care.

Material Safety Data Sheet

Product labels are good sources of initial information about the principle hazards associated with a container's contents, but they are brief summaries that are not meant to replace a product's MSDS or other reference material.

An MSDS is a chemical- or product-specific health and safety reference document. It provides detailed information about the hazards associated with a chemical or product and precautions for handling it. The chemical or product manufacturer prepares the MSDS and it is available from the manufacturer, distributor, or importer listed on the product's label. MSDSs must be on file at your institution, and is available to keep current copies in your shop, studio, or work area. Consult an MSDS whenever your students begin working with a new chemical or product and review MSDSs periodically to see if the information has changed. Although the format varies widely, the information found on an MSDS is consistent and includes:

- Manufacturer's name, address, and phone number.
- A list of the product's hazardous ingredients

including permissible exposure limits.

- A description of physical and chemical properties, as well as flammability and reactivity data.
- Health hazards information, including short- and long-term exposure effects, symptoms of overexposure, and a description of appropriate first aid and medical treatment to use in case of excessive exposure.
- Precautions for the safe handling, storage, and use of product.
- A description of how to safely handle the material under normal and emergency situations.
- Control measures including personal protective equipment, ventilation, and work/hygiene practices.

The quality of the information on MSDSs varies widely. Unfortunately some manufacturers use generic statements that are of limited value. In other cases, the health and safety guidelines have been written to address worst-case scenarios that are more typical of industrial settings and would be unusual in an art studio or shop.

Your institution is required to provide training on how to read MSDSs to all employees who use toxic materials. Training will help you learn about the products you and your students use and enable you to answer any questions they may have about the safety of the art materials and processes they will be using. Teach your students how to interpret the available safety data. If after your training you are unsure of how to read a particular MSDS, consult one of the references at the end of this document or a safety professional at your institution.

How Can Art Materials Affect Your Health?

Determining whether an art material may cause harm depends not only on the toxicity of the material, but also the does you receive. In order for an art material to affect your health, it must first enter your body and then reach an area of the body (termed the target organ or system) in a large enough concentration or dose to cause harm. Just as you need to take a sufficient dose of medicine to have a desired affect, so must you be exposed to a sufficient quantity of hazardous material to be harmed. Factors such as length of time you are exposed and how often you are exposed influence the effects.

Toxic materials can exert their harmful effects immediately (acute effects) or after a long period of exposure (chronic effects). Minor acute effects such as nausea, lightheadedness, or irritation are

generally brief and reversible, but acute effects can also be as severe as death. Chronic effects such as cancer, fibroses of the lung, or liver damage are generally not reversible. Whenever possible, substitute a less toxic material for a highly or moderately toxic one.

People involved in the arts are most likely to be exposed to toxic material either by skin contact or inhalation. A few exposures (particularly to metal) may occur through ingestion. Even though the skin is a very effective barrier, certain heavy metals such as mercury and solvents such as toluene, methyl alcohol, and glycol ethers can quickly penetrate it and, once in the body, cause harm. Other materials used in the arts, such as corrosives (acids and alkalis), can attack and destroy the outer layers of the skin, creating serious burns. Skin burns and absorption of toxic materials through the skin can be avoided by wearing chemically impermeable gloves and other chemical protective equipment and by washing contaminated skin surfaces immediately.

Many substances enter the body though inhalation of vapors, gases, fumes, mists, or dusts. For example, the solvent components of paints and inks evaporate after being plied to surfaces and may then be inhaled. Airborne contaminants in art studios can also include irritant gases and vapors emitted from photographic development solutions, polyester, epoxy, or urethane resins, as well as fumes from welding, wood dusts from woodworking, and gaseous emissions from kilns. Work that may generate airborne contaminants must be adequately ventilated to maintain safe levels; a respirator may have to be worn.

Ingestion may occur when hands, food, a cigarette, or anything else that has become contaminated comes in contact with the mouth. Ingestion is frequently the route of exposure to metals when working with painting pigments, ceramic glazes, or welding. You and your students should NEVER point the tip of your paintbrush with your lips or hold the dirty handle of your brush in your teeth! Exposure through ingestion can be avoided by frequently washing your hands, not eating or smoking in the studio, and keeping all objects out of your mouth. Prohibit eating and smoking in the art classroom or studio. Consider adopting a policy about alcohol consumption and drug use (both prescription and illegal) during studio time and beforehand.

What is a Safe Level of Exposure to Toxic Materials Used in the Arts?

A number of governmental organizations and professional

associations publish exposure standards or guidelines for airborne concentrations at levels that nearly all healthy adults are believed to be able to tolerate without adverse health effects. Exposure limits for a product's hazardous or toxic components are listed on the product's MSDS. Some people (such as young children, pregnant or nursing mothers, and individual with health conditions such as asthma) are at higher risk of exposure to art materials. If you have concerns about how hazardous material may affect a student due to a special health condition, you should talk with a medical or safety professional and with the student. The lower the exposure limits are, the more toxic the substance is.

In your classroom, as a rule of thumb, try to use solvents with exposure standards above 100 ppm whenever possible. For example, replace mineral spirits (100 ppm) with odorless paint thinner (300 ppm), or eliminate old rubber cements containing n-hexane (50 ppm) and use new ones which contain heptane (400 ppm).

All solvents should be used with ventilation, which is discussed in more detail later in this guide. The more toxic the solvent, the more solvent used, and the more quickly it evaporates (or vaporizes into the surrounding air), the greater the volume of dilution air (ventilation rate) should be.

Fire Hazards Associated with Chemicals Used in the Arts

The fire hazards associated with artist's materials are often overlooked, yet fire may be the greatest risk artists face. Common art materials that may cause a fire to include flammable or combustible solvents, oily rags, chemical oxidizers, and compressed welding gases.

Improper use of solvents causes most art-related fires. Artists must be aware of a solvent's flashpoint and volatility, the two primary properties that influence a solvent's ability to initiate a fire.

The flashpoint, the single most important factor, is the temperature at which a solvent gives off enough vapor to form an ignitable mixture with air and can ignite in the presence of an ignition source such as a flame or electrical spark. The lower the flashpoint, particularly when it is at or below room temperature, the more hazardous the material.

A substance's volatility determines how much of it will evaporate and mix with the air. In order for a solvent to catch fire, it must first evaporate and its vapors must mix with air to form the right fuel/air ratio (typically 1-3 percent). The more volatile the solvent, the more readily it will evaporate and the more likely it will create an ignitable

fuel/air mixture. Acetone is extremely volatile and if spilled, it will evaporate almost instantly. Mineral spirits, which has a much lower volatility than acetone, will evaporate much more slowly if spilled.

To control the risk of a fire, always choose a solvent with the highest possible flashpoint and the lowest possible volatility. Ventilate the area to keep the solvent concentration from reaching an ignitable air/fuel mixture. Remove ignition sources such as open flames and electrical equipment that may generate sparks. Vapors from flammable solvents are heavier than air. They can travel some distance to an ignition source and then flash back to the solvent source. When dispensing flammable solvents from large metal containers, ground both containers to dissipate static electrical charges.

To prevent fires, store rags soiled with setting oils (tung oils, linseed oil) in tightly closing metal containers and have them picked up daily for professional laundering or disposal. (Refer to the ACTS Web site in the reference portion of this guide for additional information on setting oils.) Flammable solvents should be stored in a storage cabinet designed for flammable materials. When using flammable solvents out in the studio, store them in safety cans. If you handle chemical oxidizers such as chlorates, chromates, nitrates, or peroxides, store them apart from organic solvents and other readily combustible materials in storage units specifically designed for these materials. Some types of substances such as organic peroxides and nitric acid are so reactive they should be stored separately from all other chemicals. If you use compressed gases, such as acetylene or propane, be familiar with all the complex regulations that apply to them. Secure them in an upright position and test the regulator fittings and connections for leaks before using them. Store flammable compressed gases separately from compressed oxygen.

Physical Hazards

Physical hazards in the arts include ultraviolet and infrared radiation, noise, vibration, stress to the muscular skeletal system from repetitive motion or excessive lifting, improperly maintained equipment, and poor storage and process management. They also include injury arising from carelessness and inattention.

Ultraviolet (UV) and infrared (IR) radiation are particular wavelengths of the electromagnetic spectrum just like visible light. The sun generates these types of radiation. UV radiation is also produced by electrical arcs such as those associated with are welding or carbon arc lamps. UV radiation

from any source can cause sunburn, conjunctivitis (pink eye), cataracts, and skin cancer. IR radiation that is emitted from hot objects, such as molten metal or glass and fire ceramics, can cause skin burns. It can be especially intense when working in a foundry or around kilns, or while glassblowing. Both UV and IR can damage the cornea, lens, and retina of the eye.

Teach your students to control their exposure to these radiation sources by avoiding carbon-arc lighting when possible, covering skin surfaces, and wearing appropriate shaded eye protection. If your students are welding, it is also important that they screen their work from others so no one will be inadvertently exposed. Radiation intensity decreases quickly with distance so encourage your students to increase their distance from radiation sources if possible and keep others away.

Noise is common in art studios and is produced by such things as woodworking and metal working machinery; hand, electrical, and pneumatic tools; and exhaust fans. Exposure to high levels of noise over a period of time can lead to permanent hearing loss. Symptoms of excessive noise exposure include a temporary ringing in the ears or difficulty hearing after exposure. If you must raise your voice to be heard by someone just a few feet away, the noise level is too high. The noise level emitted from equipment or processes may be reduced by dampening vibration, isolation noise-producing equipment, or installing sound absorbing materials. Such changes often require specialists and may be worn to reduce noise exposure in noisy environments. You should instruct your students about the different types of ear protection and the proper use and care of this protection.

The work of many artists—such as potters, glassblowers, and weavers—involves repetitive motion. Repetitive motion, particularly of the hands, wrists, and arms, can lead to painful inflammation of the muscles, tendons, and nerves over time and cause the eventual deterioration of those tissues. The symptoms associated with repetitive-motion disorders can include pain, warmth, swelling, and difficulty moving the joint involved. The continuous, often extreme bending of the wrist, elbow, and shoulder joints leads to these disorders. Grip positions that use high-force finger pinching along with a bent wrist have been associated with the disorder called carpal tunnel syndrome. Hand polishing and sanding, are examples of high-risk repetitive tasks.

To prevent these injuries, select appropriate tools and show students how to lie out their work so they can use more neutral postures (for

example, a straight wrist) while performing tasks. Encourage students to take frequent rest breaks to stretch muscles and schedule their work to alternate tasks. This lets them use and rest different muscles. Teach students to use as light a grip as possible when holding tools. If they cannot relieve joint pain by taking time off or reducing stress on the joint, they should seek medical assistance. Repetitive motion disorders can be disabling if not treated early.

Back injuries may occur from lifting heavy objects such as sculptures and lithography stones. Use mechanical aids such as hoists whenever possible to move heavy objects. Instruct students to lift in pairs if the object weights more than 50 pounds. Demonstrate proper lifting techniques for students including flexing your knees, keeping your back straight, holding the load close to your body, and lifting with your legs. Tell students they should never lift and twist at the same time.

Overloaded electrical circuits, extension cords, or power strips or tools that are not properly grounded may cause fires over electrical shock. Purchase tools that are double insulated. Reduce the use of extension cords and power strips by replacing them with hardwired ground fault circuit interrupter (GFCI) protected outlets when possible. When an extension cord must be used, purchase the type with GFCI built into it. If your electrical circuit breaker trips, reduce the load and reset it once. If the circuit trips again, obtain the assistance of an electrician. The circuit may have a short that could lead to a fire.

Finally, poor process management can cause an injury. For instance, in one art department, bulk supplies were received in paper bags. One student grabbed the wrong bag and used lime instead of plaster of Paris. He suffered severe burns resulting in the loss of several fingertips and requiring extensive plastic surgery. Another student took concentrated nitric acid for an etching project, but slipped on a wet floor and spilled it on herself. Although she received immediate first-aid, her arm was permanently scarred.

As an instructor, it is Important for you to work with your student to create a safe artistic environment. Pay attention to general housekeeping to prevent slips and falls. Clearly mark and appropriated store art materials. Communicate your school's safety policies to your students and hold each student accountable for compliance. Provide specific warnings and instructions for use of hazardous machines and instructions for use of hazardous machines and equipment. Post general safety rules in a visible and conspicuous place. Do not tolerate the disabling of any safety guards or misuse of the machines,

tools, or equipment. Take disciplinary action when necessary. If you are concerned about a premises hazard, or the condition of a machine or piece of equipment, immediately report it to your institution's safety coordinator and take precautions to minimize student contact with the hazard.

Safety in the Studio: Methods for Controlling Exposures

Ventilation

Older art studio designs often overlooked the importance of proper ventilation, and art instructors often have to rely on an open window, door, or window air-conditioning unit for ventilation. In many instances, these measures do not provide appropriate ventilation. There are two basic methods for adding ventilation to spaces in which toxic materials are used: dilution and local exhaust.

Dilution ventilation introduces clean air into the studio that mixes with the contaminated air before being exhausted outside by a fan. This ventilation method dilutes the air-borne contaminants to a safe level. It typically requires large volumes of air. Ideally the source of the contaminants is positioned between the fan and the student. The preferred location for introducing clean air into the studio is behind the student—the clean air sweeps past the student before mixing with contaminated air. Dilution ventilation is typically appropriate when small quantities of slightly to moderately toxic materials are used.

Local exhaust ventilation captures contaminants at their source by use of a hood. It exhausts the contaminants directly outdoors through a duct system. In some systems, particularly those used to collect dust, a filter cleans the air stream before discharging it to the outdoors. A local exhaust system is the preferred ventilating system for processes that release moderately to high toxic compounds and dusts. Art processes such as silk screen printing, acid etching, paint spraying, welding, woodworking operations, and photographic development often use local exhaust ventilation to protect artists.

Hood design and use often determine the effectiveness of the system. Some hoods, such as spray booths, completely enclose the source. Others consist of slotted hoods, canopy hoods, or flexible or fixed duct pipe systems that are positioned adjacent to the source. These must have a strong enough air draw to capture and pull in air contaminants.

Students should position their work as close as possible to slotted hoods or movable hoods because the contaminant-capture efficiency drops dramatically with distance. When working within a hood that

encloses the source, instruct students to work as far back into the hoof as practical. Before starting to work, make sure that the local exhaust system is on and that there is sufficient airflow through the system to capture air contaminants. Smoke or air-current tube can be used to test the capture efficiency of local exhaust ventilation system.

PersonalProtectiveEquipment

In the process of controlling your students' exposure to hazardous chemicals or physical agents, the first step should be the substitution of safer materials, even if they are more expensive. The second step should be controlling exposure through ventilation or other protective measures (such as limiting length or amount of exposure). If these controls are not adequate, it may be necessary to wear personal protective equipment (PPE).

Gloves are one of the more common types of personal protective equipment and can be worn to protect the hands from a variety of hazards associated with the arts. Leather gloves protect hands from sources of heat, sparks, and cuts. Heavy cotton work gloves can protect against abrasions and silvers. Rubber or other elastomeric gloves protect against chemical exposure to solvents, acids, and bases.

In order to be effective, chemical protective gloves must be selected based on the chemicals used. No glove is appropriate for all chemicals. Chemicals can degrade, penetrate, and in some instances permeate gloves without visual evidence. Most glove manufacturers produce and freely distribute charts that identify appropriate gloves to wear when working with different chemicals. Many of these are available at glove manufacturers' Internet sites. You should consult your glove manufacturer's chart when selecting gloves for your students. Instruct students about appropriate glove care. For example, students should rinse their chemical gloves before removing them and wash their hands afterwards.

It is important to protect the face and eyes from flying particles, chemical splashes, or infrared (IR) or ultraviolet (UV) radiation. The type of face or eye protection to be worn depends on the type of hazard present and severity of exposure. To protect against flying particles, wear safety glasses with side shields or goggles (preferred). Add a face shield of the potential exposure is severe. Chemical splash goggles should always be worn to protect the eyes when pouring or mixing chemicals and at all times when there is a chance of chemical splash. The vents on these goggles are located to prevent splash from

entering the goggle. To protect the face from corrosive material, add a face shield over goggles. To protect the eyes from IR or UV radiation while welding, brazing, soldering, glassblowing, or working in a foundry, wear shaded safety glasses, goggles, or a welding helmet.

Respirators should only be worn when the task or work area cannot be adequately vented to reduce the exposure to a safe level. Respirator selection must take into consideration number of factors. These include type of contaminants present (for example particulates, gas, or vapor); the concentration of the contaminant; the duration of exposure; and the functional and physical characteristics of the respirator. Seek the assistance of your institution's health and safety professional if you are considering selecting respiratory protection for use in your studio.

OSHA requires that a written program that defines how respirators will be selected, used, stored, and maintained, as well as how users will be trained and medically evaluated prior to wearing them must govern respirator use. Other types of personal protective equipment that can be worn in art studios include: (1) earplugs and earmuffs to protect against high noise sources; (2) safety shoes to protect against sparks, molten metal, heavy objects, electric shock, static electricity build up, and sole punctures; (3) hard hats to protect against falling and flying objects and electric shock; and (4) miscellaneous garments such as aprons, coveralls, leggings, sleeves, and knee pads to protects the arms legs, or front of the body from chemicals, flying objects, molten metals, and sparks.

Require students to tie back long hair. When working around furnaces, recommend that students wear long-sleeved closely woven cotton fabrics to protect against heat. Prohibit polyester and other synthetic clothing, which might melt from contact with molten metal or glass. Prohibit dangling jewelry and loose clothing when working with power tools.

Storing, Handling, and Disposing of Art Materials

The manners in which you store art materials, handle them, and clean up afterwards will significantly influence the risk of accident or exposure. This is particularly true in studios handling flammable and toxic materials.

Follow these general principals of safety storage: (1) only store compatible materials together (identify incompatible materials on an MSDS); (2) store chemical containers in cabinets, never on the floor or on shelves above shoulder height (particularly flammable solvents, acids, or base) where they may fall and break; and (3) make sure all containers are labeled and in

good condition (keep materials in their original containers or containers made of the same material). Avoid putting chemicals in breakable containers, food containers, coffee containers, or containers with loose fitting lids. Make sure that all compressed gas cylinders are secured in an upright position and have the value protection cap on when storing or transporting them.

When handling flammable or toxic materials, keep containers closed except when you are actually removing material from them. Do not allow students to eat, drink, or smoke in the studio or art project area. These activities could lead to ingestion of toxic materials or cause a fire. Impress upon students the danger of working alone in the studio.

Students should wear the appropriate personal protective equipment necessary to protect their skin, eyes, or respiratory system. If working with toxic materials, instruct students to wear clothing reserved just for that purpose, and remove it when leaving the studio. This clothing should be washed frequently, separate from other items. Better yet, provide disposable coveralls for the students. Before they leave the studio/ classroom, instruct students to wash thoroughly with soap and water any skin surface such as face, hands, and arms that may have become contaminated. Warn students that they should never use solvents to clean their hands.

Poor housekeeping can create an unsafe studio and cause exposure to toxic materials. Instruct students how to clean up spilled materials and spread absorbent to dry wet spots to prevent slipping hazards. Stress the importance of a prompt cleanup response. At the end of each session, wet mop or vacuum with a HEPA-filtered vacuum if students' work could generate highly toxic dusts such as lead, other heavy metals, or silica (fine clay). Dry sweeping re-suspends settled dust and does not remove it. Keep aisles free of obstructions such as chairs, boxes, and waste containers. Do not clutter the studio with combustible materials such as paper and cardboard.

Inspect all tools at the end of each day to make sure they are in good operating condition. Do not clutter the studio with combustible materials such as paper and cardboard.

Inspect all tools at the end of each day to make sure they are in good operating condition. Remind students to report any physical or mechanical problems with tools. Put tools and supplies away in a locked area to prevent unauthorized and unsupervised use of power tools, which could lead to accidents.

Flammable, corrosive, or reactive materials and some toxic chemicals are considered hazardous wastes. Dispose of all hazardous wastes in accordance with your institution's hazardous waste policies and procedure. If you have questions, contact your institution's environmental health and safety officer about separating, labeling, and storing hazardous waste. Never dispose of hazardous wastes in the normal trash or down the drain. They will need to be sent to an EPA- permitted disposal or treatment site. Most institutions also have procedures for disposing of normal solid waste such as metal containers or cardboard. Always follow your institution's existing waste disposal procedures.

Emergency Preparedness

Studios in which artists handle hazardous materials should have eyewash, safety showers, fire extinguishers, and first aid kits close at hand. Know where this equipment is located and how to use it. Instruct your students about the appropriate emergency response.

Keep all passageways to the emergency eyewash station and shower clear of any obstacle. Routinely check eyewash stations to be certain that water flows through them. Allow them to run for several minutes once a week to clear out the supply lines. Routinely check showers to assure that access is not restricted and that the start chain is within reach. The water flow through the safety showers should be tested periodically to ensure sufficient flow and clean out the water lines. The institution's facilities maintenance personal should perform this test because of high flow rates involved (30 gallons per minute).

Fire safety equipment should be easily accessible and must include a fir extinguisher (type ABC). Other equipment may include fire hoses, fire blankets, and automatic extinguishing systems. Check the closest fire extinguisher occasionally to make sure that it is fully charged and ready to use. Know how to activate the building's fire alarm and what the emergency procedures are for your classroom or studio. Make sure your students know this also.

Pay attention to housekeeping issues to ensure that emergency evacuation routes are clear and that materials on the premises will not cause someone to slip or trip and fall.

Maintain a first aid kit in close proximity to the classroom/studio. One individual should be assigned responsibility for ensuring that the kit is fully stocked, including PPE to avoid blood exposures. If medical assistance is not immediately available, consider first aid training for technicians or aides.

Conclusion

Safety should be a constant focus in the studio and conveyed to your students daily. Providing a safe and healthful learning environment and teaching good safety and hygiene practices will help ensure that your students enjoy an enriching academic experience. The good habits they develop will carry forward to all their future artistic endeavors.

Painting

The hazards of painting relate to paints, inks, solvents, and corrosive materials associated with this activity. Carefully review the Material Safety Data Sheet (MSDS) for the products your students will be using in the studio and identify the hazardous components in each so you may inform your students. Learn how to protect your students by reviewing the information on the MSDS. The following table identifies some of the hazards associated with materials students may use in painting and printmaking and is followed by a list of precautions.

Activity	Material	Potential Hazard
Painting	*Paint pigments/ Chalk dust*	May be toxic by ingestion or inhalation (if mixing dry powders, sanding paints, or using pastels). Many inorganic pigments contain highly toxic metals and some organic pigments may cause long-term effects such as cancer. Wherever possible, substitute less toxic materials for powdered pigments containing lead, cadmium, or mercury.
Painting	*Vehicle*	Vehicles in paints may include solvents, oil, resin, and polymer emulsions that are released to the air as the paint dries. They are moderately toxic. Some vehicles are absorbed through the skin and others may cause skin disorders.
Painting	*Solvents*	Solvents are used to thin paints and cleanup materials. Solvents commonly used include turpentine, mineral spirits, acetone, toluene, xylene, acetates, and petroleum distillates. These materials evaporate quickly, contaminating the air, and are moderately toxic by inhalation. Some solvents are absorbed through the skin. Many are flammable.
Painting	*Varnishes and Lacquers*	These are solutions of natural and synthetic resins that are dispersed in solvents such as mineral spirits, turpentine, methyl and ethyl alcohol, acetates, toluene, and petroleum distillates. After being applied, the solvent base evaporates leaving the resin to react and harden. These solvents are moderately toxic by inhalation, and many are flammable.
Spray applica-tion	*Paint Pigments, vehicles, solvents, varnishes/ lacquers*	Spray guns, airbrushes, and aerosol spray cans release very fine mist particles that can remain in the air for several hours and are readily inhaled. All of the materials identified above (solvents, pigments, resins, and paint vehicles) may be present. Spraying dramatically increases your risk of exposure to these toxic materials. Many of these solvents are also flammable and spraying them into the air creates flammable atmosphere. High-pressure spray guns may actually inject paint directly under the skin if it gets in the way of the spray.

Painting Precautions for Your Students

- If possible, use tube or pre-mixed paints and commercially available inks to avoid mixing your own. If you mix your own pigment, do it in a ventilation hood. Use water-based products instead of solvent-based ones where possible. Keep all chemical containers closed when they are not in use.
- Never use your lips to point the end of your paintbrush or hold your brush handle with your teeth. Because your hands become contaminated while working, do not eat, drink, or smoke in the studio. Wash your hands thoroughly when you finish working or leave the studio. Never wash your hands in solvent. If your hands have cuts, or are chaffed, wear gloves. Chemicals can pass through these breaks in the skin and enter directly into your blood stream. Washing your hands frequently may dry them out, increasing the risk for cracks and breaks to develop in the skin. Apply skin moisturizers regularly to prevent your skin from drying out. Good personal hygiene is one of the most important ways you can reduce your exposure.
- Use the ventilation measures described in this guide to control solvent exposures.
- Wear full-length smock or coveralls in the studio and do not wear them outside the studio. Wash them frequently and separately from other clothing. If toxic materials are being used, wear a full-length disposable smock or coveralls that are removed and properly disposed of in the studio. Wear chemical protective gloves, apron, and eye protection(goggles) as necessary when handling solvents and corrosive chemicals, or when cleaning brushes, screens, and other equipment.
- If you will be applying a pint or more of a product that contains a flammable solvent, remove all source of ignition from the area. Store flammable materials in flammable-storage cabinet. Place all solvent-soaked rags and paper in self-closing oily waste cans and empty them daily. Know the location of the closest fire extinguisher and learn how to use it.
- Perform spray applications in a paint-spray booth or other locally exhausted hood. Choose brushing techniques rather than spray applications if possible.
- Avoid exposure to solvents during clean up by using disposable screens, brushes, and other equipment. Clean up small spills immediately.
- Use barrier creams to prevent casual contact with toxins.