



# Virginia Commonwealth University

## Art Safety Guide

*Important information for students, faculty, and staff*  
*Academic Year 2024 - 25*

*Version 3.1 8/16/2024*

## **PREFACE**

This art safety guide is provided by the [VCU School of the Arts](#) with guidance from Virginia Commonwealth University Safety and Risk Management (SRM) department to familiarize faculty, staff and students with important environmental health and safety information as it relates to the visual and performing arts. The contents of this guide have been kept as concise and as specific to the VCU School of the Arts as possible.

Many health and safety program areas (e.g., hazard communication, personal protective equipment, injury/illness reporting, fire safety, etc.) are only briefly addressed as more detailed information is provided in Safety and Risk Management Programs and HR Benefits. Questions, comments, or requests for additional information should be directed to the SRM:

<b>Safety and Risk Management locations:</b>	Monroe Park Campus: 700 W. Grace St. Ste. 2100, 3100
<b>Mailing address:</b>	Virginia Commonwealth University Safety and Risk Management – Occupational Safety 700 W. Grace St. Richmond, Virginia 23220
<b>Telephone:</b>	Main Office: 804-828-0040
<b>Fax:</b>	Main Office: 804-828-8316
<b>Web Site:</b>	<a href="https://srm.vcu.edu">https://srm.vcu.edu</a>

# Introduction

Much of what we do in art brings us into contact with hazardous materials and processes, as well as tools and equipment that need proper safe procedures. Don't be alarmed—be aware. This safety guide provides basic information on the primary hazards associated with different artistic mediums, along with the safe use of tools and equipment.

This information is not meant to discourage you from practicing your art. Instead, it is meant to make you a wiser and healthier art practitioner. All you have to do is 1) read this information, 2) know what you're dealing with before you start working in an area where hazardous materials or processes are used and 3) follow the recommended precautions. Improper use of equipment, poor work practices, and inappropriate handling, storage and disposal of hazardous materials can have dire consequences on your health and safety and can lead to regulatory fines.

This manual applies for the studio and workshop experiences in the following departments and programs: Art Education, Communication Arts, Craft and Material Studies, Fashion Design and Merchandising, Graphic Design, Interior Design, Kinetic Imaging, Painting and Printmaking, Photography and Film, Sculpture and Extended Media, Theatre, Art Foundation and Cinema.

*Remember: If you have any questions or concerns about safety, talk to your professor or graduate assistant—they are there to help you. If they are not available, or you would like to consult with Safety and Risk Management, you may contact SRM's occupational safety manager.*

## Responsibilities

The Virginia Commonwealth University Safety and Risk Management (SRM) department serves the University community by providing technical support, information and training, consultation and periodic audits of environmental health and safety practices and regulatory compliance.

The Departmental Safety Representative (DSR) for each department will serve as a liaison between SRM and the corresponding department. The DSR is a point of contact for departmental faculty, staff and students for environmental health and safety issues.

Faculty in the School of the Arts are responsible for ensuring that students receive and understand appropriate safety training on potential hazards and that students observe and implement the safe work practices and hazard control measures outlined in this art safety guide. Faculty members are responsible for communicating with their DSR on environmental health and safety issues and concerns.

Artists (both student and faculty) are responsible for obtaining safety training and observing the general and studio-specific safety precautions outlined in this art safety guide. Student artists are responsible for reporting any art-related injuries, hazardous

materials spills, and unsafe conditions or work practices to their course instructor and/or graduate assistant.

Willful disregard for safety by student artists may result in expulsion from the studio and other disciplinary action.

## **Emergency Response Procedures**

For any emergency, including fire, explosions, accidents and medical emergencies, contact VCU Police at 804-828-1234. VCU Police will determine whether additional assistance is needed and will alert others as necessary.

### **Fire**

A fire contained in a small vessel (like a waste basket) can usually be suffocated by covering the vessel with a lid of some sort. If you have been trained in the proper use of a fire extinguisher, you may put out small, incipient stage fires (no bigger than a wastepaper basket). Be sure to fight the fire from a position where you can escape and only if you are confident, you will be successful.

**If your clothing catches fire, drop to the floor and roll to smother the fire.**

#### **If you hear the fire alarm:**

Begin evacuation of the building using the nearest stairwell or ground floor exit door. Go to the designated assembly area and stay with other building occupants. When VCU Police representatives arrive, notify them of the exact location and details of the fire.

Do not re-enter the building until an “all clear” is issued by VCU Police or local fire department officials.

### **Hazardous material spills**

Spills of hazardous materials (acids, solvents, etc.) should be confined in a safe manner, if possible. Spill containment techniques include diking or enclosing the spill, covering the spill with absorbent material, ventilating the area, or closing the door to the spill area. It may be necessary to unplug electrical equipment or turn off sources of ignition in the event of a solvent or flammable liquid spill.

In case of a hazardous material spill, remember the acronym SPILLS:

- S**ize            of spill and the size of the container
- P**roduct        what is it, check SDS for information
- I**mpact        what are the hazards (flammable, toxic, reactive, corrosive)
- L**ocation      of spill: room or area, on counter or floor, heading towards a drain?
- L**eave area    and contact appropriate help
- S**ummon help to clean up spill, remove the waste or refill spill kit

- Alert others in the immediate area and evacuate the area if necessary.
- For non-emergency spills contact SRM during normal working hours or the Facilities Operation Center during non-working hours.  
For all emergencies contact the Environmental Health and Safety.

When reporting a spill, include the following details if known:

- location of the spill (building, floor, and room number)
- chemical or product name from safety data sheet (SDS)
- approximate quantity spilled
- if anyone was injured or exposed to chemical spill

## **Chemical exposure**

The following procedures should be followed in the event of chemical exposure. ***In all cases, the incident should be reported to faculty, regardless of severity.*** Also refer to injury/illness procedures in the next section.

### Chemicals on skin

Immediately flush the affected area with water for no less than 15 minutes. Remove any contaminated jewelry or clothing to facilitate removal of residual material.

If medical attention is needed, call VCU Police at 804-828-1234 and explain what chemicals were involved.

Bring SDS when seeking Emergency Medical treatment.

Review the safety data sheet (SDS) for any delayed effects.

### Chemicals in eyes

Flush eyes at the nearest eyewash station with water for at least 15 minutes. Hold eyelids open and rotate eyeballs so all surface areas can be rinsed.

If applicable, remove contact lenses while rinsing. Do not attempt to reinsert them after rinsing.

Seek medical attention regardless of severity. Call VCU Police at 804-828-1234 and explain what chemicals were involved.

Bring SDS when seeking Emergency Medical treatment

Review safety data sheet (SDS) for any delayed effects.

### Chemical inhalation

Provide fresh air by opening windows, closing chemical containers and providing fans.

If symptoms such as headaches, nose or throat irritation persist and medical attention is needed, call VCU Police at 804-828-1234 and explain what chemicals were involved. Follow the administrative procedures identified below for reporting the incident.

Have safety data sheet (SDS) available for review by health care professionals, and reminder of health effects due to potential exposure.

## **Injury/illness**

If someone is injured while visiting, working or attending classes at the VCU School of the Arts, it is important that the incident be reported as described below.

*In all cases, if the injury is serious, call VCU Police at 804-828-1234 immediately.*

### **Employees**

Employees who suffer any work-related injury/illness—even if it is minor and medical care/treatment is not provided or anticipated—must report the incident to their supervisor immediately and complete a [Accident Report Form](#). Supervisors are responsible for completing and signing the form and assisting with the incident investigation. If the injury is serious, call VCU Police at 804-828-1234 immediately.

At the time of completing the Accident Report Form, the employee should also complete a [Physician Selection Form](#) to choose a worker's compensation panel physician, even if no need for medical care is anticipated. If the injury or illness is deemed compensable by the state employee workers' compensation program, any follow-up treatment rendered through a panel physician is compensable but any follow-up treatment from non-panel providers may become the employee's financial responsibility. The Physician Selection Form should be returned to the worker's compensation office in VCU HR along with a copy of the Accident Report Form.

If the injury is not serious or life-threatening, but still requires medical attention, the employee may proceed to the nearest clinic/hospital or to their personal physician initial valuation and treatment. If medication is prescribed as part of initial treatment, the employee should contact the worker's compensation office in VCU HR at (804) 828-1533 or [workcomp@vcu.edu](mailto:workcomp@vcu.edu) to request a workers' compensation prescription card. Prescriptions from the first visit are covered by workers' compensation are covered even if the claim is later deemed non-compensable under worker's compensation. **Personal health insurance should NOT be used for treatment of work-related injuries beyond initial treatment.**

For employees who participate in a COVA health plan, the first 30 days of treatment are covered by the state employee workers' compensation program through an Assignment of Benefits arrangement, even if the accident is later deemed non-compensable under workers' compensation. as long as the accident is reported to the state program by VCU HR within 10 calendar days. To ensure this protection, VCU HR must receive the Accident Report promptly.

**NOTE: A copy of the completed *Accident Report Form* must be submitted to Workers' Compensation at [workcomp@vcu.edu](mailto:workcomp@vcu.edu) or 804-828-1533 within 24 hours of the incident.** VCU HR cannot file the claim with the state employee worker's compensation program unless both pages of the form are filled out completely and received promptly. If an employee is incapacitated and unable to complete the employee section, the supervisor section should be submitted separately as soon as possible. Delays in reporting to the state program can jeopardize workers' compensation benefit.

All reported inhalation exposures will be followed up by SRM to determine whether adequate engineering controls are available, sufficient work practices are used to minimize exposure, or whether respiratory protection will be required.

### Visitors

Immediately notify VCU Police at 804-828-1234 of any injury or illness involving visitors. The visitor should complete the [Non-Employee Incident Report](#) form.

### Students

In case of medical emergency, on-campus students should call VCU Police at 804-828-1234; off-campus students should call 911. Students who suffer an injury or become ill should report to the Student Health Center (SHC) for evaluation and treatment. If the injury or illness is related to on-campus activities or an unsafe condition in a University building or on VCU property that may require follow-up by SRM, the student should complete the [Non-Employee Incident Report](#) form.

If the injury occurs during classroom activities, the course instructor should be notified immediately and the [Non-Employee Incident Report](#) form should be completed by the course instructor.

All reported inhalation exposures will be followed up by SRM to determine whether adequate engineering controls are available, sufficient work practices are used to minimize exposure, or whether respiratory protection will be required.

## **General information**

### **Potential hazards**

Some art materials and processes use or generate hazardous chemicals or physical agents (such as infrared light, high temperature and high noise) or involve mechanical equipment that can cause serious injury. General information about potential hazards in art is provided below. Other important health and safety information is provided in the studio safety section of this guide. Be sure to review both the general information as well as applicable studio safety information.

### **Chemical hazards**

*How can art materials affect your health?*

As you move on to your career in art, you will be using the materials and processes particular to your field each and every day, so it's extremely important to develop safe habits from the beginning to avoid potential health problems now and in the future. All artists need to understand the inherent hazards (i.e., flammability, toxicity or reactivity) in various art materials and appropriate precautions to protect against illness or injury.

Your exposure to hazardous chemicals can occur by various routes of entry including inhalation, eye splashes, skin contact (dermal absorption) or accidental ingestion.

(Injection is another potential route of exposure but it is most significant among health care workers.) Materials that become airborne either by evaporation (like solvents) or when disturbed (powdered clay) are potential respiratory (inhalation) hazards. Welding operations can produce both metal fumes and toxic gases. Any use of hazardous chemicals should be conducted with adequate dilution ventilation or local exhaust when necessary.

Some compounds, like toluene, can also be absorbed through the skin so chemical protective clothing may be needed. Accidental ingestion of chemicals can occur when food, beverages or cosmetics are handled in contaminated areas or with dirty hands. This is why consumption of food and beverages is not allowed in areas where hazardous materials are present, and why hand washing is so important. Eye exposures can occur during pouring of hazardous chemicals and procedures that cause splashing. Proper eye protective gear must be worn during these activities.

Exposure to hazardous materials may cause immediate adverse health effects, delayed health effects or possibly no observed effects. This will depend on the material, the duration and frequency of exposure, whether or not appropriate personal protective equipment was used, good hygiene practices and individual susceptibility. Every effort should be made to substitute products with safer more environmentally friendly products when possible. This will be further discussed in the Hazard Control Measures section.

*You want to use the safest materials available. So how can you find out about the chemical hazards of materials you'll be using?*

The following are available resources to help inform you of the chemical hazards associated with your art materials:

The two best sources of information on chemical hazards are the product's label and its [safety data sheet \(SDS\)](#). Manufacturer's labels include the name of the material, chemical composition, exposure hazard warnings and information about special handling procedures, personal protective equipment and first aid instructions. If chemicals are transferred from the original manufacturer's container into a secondary container, the secondary container must be labeled with the material's identity and the appropriate hazard warning—words like Danger: Inhalation Hazard. Never transfer chemicals into old food and beverage containers unless the food label is removed or completely obscured.

The SDS provides more detailed information. For example, various solvents are commonly used in studio art classes. When selecting which product to use, consideration must be given to its toxicity, volatility, flashpoint, and waste disposal options. This information can be obtained from the SDS. Toxicity can be determined by looking at the exposure limit, the lower the exposure limit, the more toxic the substance.

A product's potential to cause a fire or to present an inhalation hazard is related to flashpoint (the ability to form an ignitable mixture) and its volatility or tendency to evaporate. The lower the flashpoint, particularly when it is at or below room



temperature, the more hazardous the material. Volatility is measured by vapor pressure, the higher the vapor pressure, the more volatile the material. Acetone is extremely volatile and will evaporate almost immediately whereas mineral spirits are much less volatile.

OSHA regulations require VCU to maintain an inventory of hazardous materials and an SDS on each product. The SDS for materials used in each department are maintained in each studio area and their respective department offices. If you can't locate an SDS, contact your instructor or SRM for assistance.

All faculty and students should be familiar with the format of the SDS and where to locate pertinent information before a spill event or potential exposure occurs. The following sections should be studied to understand the risks associated with the chemicals that may be present in art materials:

- SECTION 2: Hazards Identification
- SECTION 3: Composition/Information on Ingredients
- SECTION 8: Exposure Controls/Personal Protection
- SECTION 11: Toxicological Information

**The Art and Creative Materials Institute (ACMI)** provides labels on art supplies in the United States as well as other parts of North America. These labels are seals that indicate the potential toxicity of your art supplies. The American Society for Testing and Materials (ASTM) is the organization that conducts the testing and is referenced at the bottom of the seal. There are two seals - AP and CL. The AP seal is a rating found on a product that is non-toxic by the ACMI in accordance with the ASTM. The CL seal is a rating that indicates a potential risk by the ACMI in accordance with the ASTM.



### **Physical hazards**

Exposure to physical hazards of an acoustic, electromagnetic or thermal nature can cause adverse health effects. Physical hazards in the School of the Arts may include high noise (woodworking and metalworking operations), optical radiation (infrared/ultraviolet light in welding and glassmaking) and thermal burns/heat (glassmaking.)

### **Mechanical equipment**

Use of powered equipment (band saws, grinders, belt sanders, clay mixer, etc.) can present a variety of hazards, such as wiring/electrical hazards, moving parts (gears, pulleys and belts) and high noise. Do not use equipment if you are not authorized to do so, haven't been trained or are uncertain about what to do. Ask for help. Follow posted instructions for equipment use. Never operate mechanical equipment or power tools while under the influence of drugs, alcohol, medication, or other conditions that may

affect your mental alertness.

**Fire/shock aged power cord, etc.) to your instructor. Do not use damaged equipment**—tag it with a warning label and remove damaged equipment from service. Do not use electrical equipment in wet or damp locations. Make sure electrical outlets in wet areas are equipped with ground fault circuit interrupters (GFCIs).

### **Hand tools (non-powered)**

Examples of non-powered hand tools that artists may use include utility knives, chisels, snips, punches and hammers. Hand tool injuries are often related to improper use or maintenance of the tool.

Some ways to avoid hand tool injuries include:

Inspect tools before use to make sure they are in good condition. Worn or defective tools should be repaired or discarded. Report any defective equipment to your instructor.

Use the right tool for the job, i.e., don't use a wrench as a hammer. Also use the correct size tool for the job.

When using a knife, cut away from the body and keep hands and body clear of the knife stroke.

Dispose of razor blades and utility knife blades in a puncture-resistant sharps container.

Store tools safely. Sharp edges or blades should be protected or enclosed to prevent accidental contact.

Keep tool cutting edges sharp so the tool will move smoothly without binding.

Maintain a good grip and stand in a balanced position to avoid sudden slips.

Avoid awkward postures, such as bending, twisting or reaching.

Consider using ergonomically designed tools (especially for those that will be used frequently) that fit the hand well. SRM can provide assistance with selection of ergonomic hand tools.

### **Ergonomic hazards**

Back injuries may occur from lifting heavy or awkward objects such as sculptures or lithography stones. Use mechanical aids, such as hoists, whenever possible to move heavy objects. If an object weighs more than 40-50 pounds, get someone to help you lift it or use mechanical aids. Always use proper lifting techniques: keep your back straight, hold the load close to the body, flex your knees and lift with your legs. Never lift and twist at the same time. more neutral postures (for example, a straight wrist instead of a flexed wrist) while performing tasks. Further information on ergonomics can be obtained from the SRM website and other online sources.

### **Compressed gas cylinders**

Compressed gas cylinders—including empty cylinders—must be properly always secured in an upright position using an appropriate stand, chain or strap. The protective valve cap shall remain in place until the regulator is attached.

Some other safety precautions for gas cylinders include: When moving cylinders, keep them in an upright position and use a cylinder cart or hand truck. Cylinders must be properly secured with a chain or strap and have the protective valve cap in place while being moved. Do not roll or drag cylinders. Avoid dropping cylinders or allowing them to strike one another. Never move gas cylinders without a cylinder cart or hand truck.

- Do not use oxygen fittings, valves, or regulators for other types of gases. Always use the proper valve connections.
- Cylinders containing flammable gases, such as acetylene, must be stored separately from oxidizers (oxygen) by either a 20-foot distance or by a non-combustible 5-foot-high barrier. The only exception to this is an oxy-acetylene welding cart.

## **Hazard control measures**

Typically, in dealing with known health and safety hazards, a variety of control measures are used to reduce, or better yet, eliminate the hazard. Control measures include engineering controls, work practice controls, and finally, use of personal protective equipment. Typically, more than one control method is used.

**Engineering controls** include the use of either general exhaust (dilution) or a local exhaust system. Dilution ventilation involves bringing in clean air to dilute the contaminated air and exhausting the diluted air to the outside via exhaust fans. Note: An open door/window or recirculating fan does not provide adequate ventilation for toxic gases and vapors. Local exhaust ventilation involves collection and removal of contaminants near their source so it is much more efficient and effective for some operations.

Examples of local exhaust systems found in the VCU School of the Arts include spray booths (glaze room, printmaking studio and undergraduate sculpture studios), canopy exhaust hoods over kilns, chemical fume hoods (printmaking, glaze room and plaster area hot plate), and specially designed slot exhaust ventilation (photography and printmaking darkrooms and clay mixing room). Engineering controls also include machine guards.

**Work practice or administrative controls** include training, good housekeeping and work practices. For example, flooring in the ceramics studio should be wet mopped instead of swept, which can disturb settled dust and cause it to become airborne. Other work practice controls include proper storage of art materials, keeping solvent containers closed when not in use and proper labeling of chemical containers. In addition, administrative controls include changes in the process, substitution, or isolation. Process changes include changing from a paint spraying operation to paint brushing to minimize aerosol production. Substitution means using a less hazardous material or process instead of a more hazardous one (e.g., use of water-based paints instead of solvent-based paints or use of lead-free glazes and enamels.) Isolation means separating the hazardous operation from exposed personnel, either by distance or by placing barriers.

**Personal protective equipment (PPE)** includes use of respirators, hearing protection, eye protection (glasses or goggles), hand protection (gloves), face protection (face shield) and foot protection. See the [PPE and clothing](#) section of this guide for additional information.

*NOTE: Suitable eye protection is required in all studios where there is a risk of chemical splash, flying particles or optical radiation (infrared and UV light).*

## **Fire safety**

See [Emergency Response Procedures](#) section of this guide for additional information.

Pre-plan your response to a fire emergency and participate in emergency evacuation drills. Review the Emergency Action Plan (EAP) for the School of the Arts building in which your classes are located (Fine Arts Building, Pollak Building, The Depot, Franklin Terrace, Buford House, the Singleton Center, The Anderson, Art Foundation and all other VCUarts buildings). The EAP should be reviewed by department personnel and students at the start of each semester. Know where the nearest fire alarm pull station, fire extinguisher, exit stairwells and outside assembly area for the building in which your respective class is located. Remember, elevators cannot be used in a fire emergency.

Be familiar with the alarm system in your building. When you hear the alarm, evacuate the building immediately and do not return to the building until VCU Police or local fire department officials have issued the “all clear.”

In addition to knowing what to do in event of a fire, it is important to take the following precautions to keep the building safe and to avoid causing a fire:

- Don't block access to emergency equipment such as fire extinguishers and fire alarm pull stations.

- Keep exit routes, aisles, stairwells, and doors clear of obstructions.

- Don't store materials within 18 inches of an overhead sprinkler.

- Keep containers of flammable/combustible liquids capped when not in use.

- Use flammable/combustible materials in a well-ventilated area (preferably with a chemical fume hood) and keep them away from sources of heat and ignition.

- Note: Always remove butane lighters from pockets before working around hot processes such as glassmaking and welding.*

- Store flammable/combustible liquids properly. Approved safety cans or an FM/UL-approved flammable liquid storage cabinet may be necessary.

## **Personal protective equipment (PPE) and clothing**

PPE includes eye and face protection (safety glasses, goggles, shaded lenses, face shields), head protection (hardhats), foot protection (steel-toed shoes), hand protection (gloves), hearing protection (ear plugs, ear muffs) and respiratory protection.

Technically, PPE does not include clothing such as long pants, long-sleeved shirts and closed-toe shoes, but such apparel *can* provide an additional level of protection to artists. Some clothing can actually be hazardous to artists. For example, synthetic fabrics should not be worn around hot processes (i.e., glassmaking, welding and furnaces)

because they can catch fire, melt and cause serious burn injuries. Loose clothing (sleeves, neckties, scarves, etc.) and jewelry (rings, watches, etc.) can become caught in machinery; these items should be removed before working with power tools.

All artists are encouraged to review the PPE selection and usage issues described below, as well as studio- and equipment-specific PPE and clothing recommendations. Safety data sheets (SDS) also provide information on recommended PPE.

PPE is usually the last line of defense after other hazard control methods have been implemented. There are several drawbacks with use of PPE: Wearing PPE can be awkward or uncomfortable (especially in hot weather) and can sometimes get in the way. People often get a false sense of security when they use PPE and rely too heavily on it. Also, PPE protects only the person wearing it, but the hazards still exist and may harm unprotected personnel. Problems such as incorrect fit, use of the wrong PPE for the job, and use of damaged or poorly maintained PPE can result in less than adequate protection.

In order for PPE to be effective, the user must be trained to:

- Know when PPE is necessary
- Know what kind of PPE is necessary
- Know how to use PPE properly
- Understand the limitations of the PPE (what it can and cannot do)
- Know how to wear and adjust PPE
- Know how to properly maintain PPE

Selection of PPE first requires a hazard assessment to identify conditions or processes that can produce the following hazards:

- Falling objects
  - Objects that could puncture the skin
  - Objects that could roll over feet
  - Toxic chemicals
  - Heat
  - Harmful dust
  - Optical radiation (visible, ultraviolet or infrared light)
  - High noise
-

### **Hand protection**

Gloves are used to protect against cuts, punctures, burns, chemical absorption or temperature extremes. It is important that the correct type of glove is used since the wrong glove may not provide the necessary protection. This is a particular problem with chemical absorption where the wrong glove may allow certain chemicals to reach your skin and you may not realize it. Glove selection begins with knowledge of the chemical composition of your art materials as determined from the SDS. Glove manufacturers provide chemical resistance ratings for various types of gloves and chemicals. The SRM PPE Program can provide information or assistance with the selection of appropriate gloves.

### **Hearing protection**

As a general rule of thumb, if noise levels require you to raise your voice to speak with someone at a distance of about 3 feet, the noise level may be considered hazardous and use of hearing protection is recommended. Some operations associated with studio art activities (particularly mechanical equipment in the wood and metal shops) can produce high noise levels. Artists with frequent or prolonged exposures to high noise levels are strongly urged to use hearing protection in the form of ear plugs or ear muffs to prevent noise-induced hearing loss. If any faculty or student suspect that they are in a hazardous noise environment, contact SRM for further evaluation.

### **Respiratory protection**

Air contaminants (particulates, gases, vapors, fumes, mists, etc.) can usually be effectively controlled with adequate ventilation and good work practices. However, there are some potential inhalation risks and tasks associated with handling of art materials that should be evaluated to ensure engineering controls are effective. The use of spray fixatives, aerosol paints, solvents and other products that contain hazardous chemicals; any mixing or extensive handling of dry powders such as clays, glazes, pigments, sands, etc. may require the use of respiratory protection if the task cannot be effectively controlled with local exhaust ventilation. See the section on Studio Safety Hazards and Precautions for more information.

Any use of NIOSH-approved dust masks/N-95 disposable respirators, or reusable elastomeric half-face or full-face respirators must be approved by SRM. To initiate this process, a Respiratory Hazard Assessment (RHA) form must be completed by the individual requesting respirator use. If a team/group will need respiratory protection, the RHA should be completed by the group leader/supervisor and returned to SRM for review. Upon review, we will determine whether respiratory protection is necessary, the type of respirator and what cartridge if a reusable respirator is selected. In some cases, an onsite visit to review the process may be necessary.

The use of any type of tight-fitting respirator (has a face-to-mask seal) requires a medical clearance through Employee Health Services (EHS) or Student Health Services (SHS). A Respirator Questionnaire will be completed and submitted to either department depending on the user's employee or student status. Once the questionnaire is reviewed and respirator use is approved, the user will receive a Fitness Report from EHS or SHS via email, and the user can schedule training and fit testing with SRM.

Please go to our website for further information about our Respiratory Protection Program and to download any required forms.

### **Eye and face protection**

It is important to realize that face protection and eye protection are not the same thing. Use of a face shield alone does not provide adequate eye protection; eye protection is always required whenever a face shield is used.

Eyes must be protected against a variety of hazards. Specific information on eye protection is summarized in the following table:

<b>Activity</b>	<b>Potential hazard</b>	<b>Minimum eye protection</b>
Sanding, grinding, chipping, woodworking	Impact, flying particles <sup>1</sup>	<ul style="list-style-type: none"> <li>• Safety glasses with side shields or</li> <li>• Goggles (direct vent)</li> </ul>
Chemical handling, pouring	Chemical splash <sup>2</sup>	<ul style="list-style-type: none"> <li>• Goggles (indirect vent)</li> <li>• If severe exposure, also wear face shield</li> </ul>
Kiln or furnace operations, casting glass or molten metal	Glare, heat, optical radiation <sup>3</sup>	<ul style="list-style-type: none"> <li>• Shaded goggles or glasses</li> <li>• If desired, also wear face shield to reduce heat and provide face protection</li> </ul>
Welding (electric arc)	Optical radiation <sup>3</sup> , sparks	<ul style="list-style-type: none"> <li>• Welding helmet or welding shield (filter shade 10-14)</li> </ul>
Welding (gas)	Optical radiation <sup>3</sup> , sparks	<ul style="list-style-type: none"> <li>• Welding goggles or hand shield (filter shade 4-5)</li> </ul>
Cutting, brazing, soldering	Optical radiation <sup>3</sup> , sparks	Welding goggles or hand shield: <ul style="list-style-type: none"> <li>• Cutting (filter shade 3-6)</li> <li>• Brazing (filter shade 3-4)</li> <li>• Soldering (filter shade 1.5-3)</li> </ul>

#### **<sup>1</sup>Protection against impact or flying particles**

Protection against impact or flying particles is available with three types of eyewear: safety glasses with impact-resistant lenses and side shields, flexible or cushioned goggles, and chipping or eyecup goggles. A combination of goggles and face shield is recommended for some processes where face protection is also necessary. Always look for the American National Standards Institute (ANSI) Z87 logo on eye and face protective equipment. *NOTE: Regular eyeglasses do not provide impact protection.*

#### **<sup>2</sup>Protection against chemical splash**

Selection of suitable protection against chemical splash depends on the chemical and the quantity involved. For the limited quantities of acid solutions handled at VCUarts, use of either goggles and a face shield or goggles with baffled ventilation will provide adequate eye protection.

If chemical splash to the eyes/face does occur, proceed to the nearest eyewash station, and flush the eyes with water for 15-20 minutes. Follow other injury response and notification procedures described in the Emergency Response section of this guide.

#### **<sup>3</sup>Protection against optical radiation**

The type of protection needed against optical radiation depends on the type of radiation exposure. Carbon arcs and electrical welding require protection against ultraviolet (UV), visible and infrared radiation. UV radiation can cause conjunctivitis (“arc eye”), sunburn and skin cancer. A face shield is necessary as well as goggles. A general rule of thumb is to use the darkest shade possible that is compatible with visibility.

In oxy-acetylene welding, glassmaking, soldering, kiln use, and foundry work involving molten metal, the concern is mostly with protection against visible and infrared radiation. Chronic exposure to infrared radiation can lead to development of cataracts. Shaded goggles are recommended where infrared radiation hazards are present. For glassblowing and foundry work, a shade number of 3-5 is often used. If there is a possibility of splashing molten metal (foundry pours), a face shield is recommended in addition to eye protection.

### ***Contact lenses***

Recent evidence has shown that contact lens wearers are not at an excess risk of eye damage in the presence of potentially harmful chemicals, dusts, etc., as long as the proper eye protection is worn. However, because of heat exposure, contact lens use is prohibited in the Department of Craft/Material Studies glass studio.

### ***Equipment maintenance***

Protective eyewear and face shields should be inspected regularly for scratching, pitting, etc., and replaced if necessary. If the equipment is used by more than one person, it should be cleaned and disinfected after use. Equipment should be stored away from heat, light, and further contamination.

More details on PPE and the hazard assessment process are provided in the SRM PPE Program.

## **Working alone/unsupervised**

Students are reminded that they should not work in shop areas (i.e., wood shop, metal shop, glass area, foundry, and kiln room) without supervision until they have experience and training to do so. Typically, first-year students are not authorized to work without supervision. No undergraduate students are allowed to work unsupervised in Hodges Theater or the Theatre Scene Shop at any time.

Work involving hazardous equipment and processes really should not be done alone—especially after hours. Use of a buddy system is strongly recommended. Due to numerous security and safety hazards, some shops and studios are locked after hours. Also, some equipment is locked out or de-energized to prevent unauthorized usage. The buddy system is mandatory for students working in Newdick Theatre.

Building security is in place to protect you. School of the Arts buildings are locked after normal work hours. ***Don't jeopardize the building security or your personal safety by propping windows and doors open.*** VCU Police should be notified of your presence in buildings after hours. Anyone found not in compliance with safety and security practices will be subject to disciplinary action.

## **Waste management and disposal**

Several types of waste are generated in visual and performing arts processes, such as solvents, oil-based paints, ceramic glaze and photographic processing chemicals. Many of these wastes are considered hazardous waste by the U.S. Environmental Protection Agency (EPA) and require special handling. Hazardous wastes should be collected and disposed of via commercial disposal companies; ***they may not be poured down the drain or placed with regular trash.***

[Hazardous waste disposal is arranged through the Laboratory Safety Section of SRM.](#)



In order to minimize hazardous waste issues, consider the following:

Don't purchase more of a material than you expect to use in the foreseeable future. Costs of disposal can exceed bulk purchase savings.

Substitute with a less hazardous material whenever possible.

Make sure all chemical and waste containers are [properly labeled](#).

Waste should be placed in designated area for pickup by SRM.

Keep chemical and waste containers closed when not in use.

- Don't accept donations or gifts of potentially hazardous materials.
- Don't store chemicals in your personal locker

In general, waste from the School of the Arts can be categorized into one of four categories: recyclable waste, regular waste, hazardous waste, and universal waste. Hazardous waste and Universal Waste are regulated by the Environmental Protection Agency and the Virginia Department of Environmental Quality. Some examples of art wastes that fall into these categories are listed below:

**Recyclable waste:** Paper, plastic (food and drink containers), broken glass and aluminum

**Regular waste:** Wood, water-based paints (after drying in container) and glazes (after being fired)

**Hazardous waste (commercially disposed through SRM):** Concentrated acids and bases, organic oils (linseed oil, tung oil, turpentine, etc.), enamel or oil-based paints, solvents (mineral spirits, acetone, toluene, xylene, etc.), solvent-soaked rags and paper towels (oily rags) and waste glazes from ceramics; **these must be labeled correctly and placed in a secure container**

**Universal Waste:** Used fluorescent lamps, batteries, mercury containing equipment (old ballasts, etc).

*Note: Contact the SRM's Laboratory Safety Section for specific information on collection and disposal of wastes.*

## General safety summary

1. **Know your materials and their hazards.** Learn about the content of art materials and their hazards by reviewing labels and safety data sheets (SDS) prior to beginning work. Whenever possible, try to use the safest materials and processes available. For example:

Choose water-based materials instead of solvent-based ones.

Eliminate toxic metals like lead and cadmium (e.g., use cadmium-silver solders and lead-free glazes and enamels).

Use wet techniques instead of dry techniques to minimize dust production (e.g., wet sanding or wet grinding).

Apply coatings by brushing or dipping instead of spraying.

Choose products that do not create dusts and mists. If possible, avoid using materials in powder form or aerosol products or use them with local exhaust ventilation.

**Know where emergency equipment is located and what to do in the event of an emergency.** Examples include:

- Eyewash stations and safety showers
- Fire alarm pull stations, fire extinguishers and designated evacuation assembly area
- Emergency phones
- Injury response procedures (notification, recordkeeping & health care resources)
- Locations of safety data sheets (SDS)

**Practice good hygiene.** It's a simple way to avoid exposure to toxic substances.

Never eat, drink, smoke, chew gum/tobacco or apply cosmetics in the studio or shop, or wherever there is a potential for chemical exposure.

Wash your hands and exposed skin thoroughly with soap and water after using any hazardous material or substance, and before eating or smoking. Don't forget to wash under your fingernails. Keep nails trim and clean, and do not bite nails.

Never use toluene, turpentine, or other solvents to remove paint, inks or stains from your skin. Baby oil can be used to remove paint.

Never hold brushes or tools in your teeth or mouth.

**Keep studio space clean and organized.** Continuous and diligent cleaning of the studio reduces the risk of accident and fire. Designate a separate area for work with potentially hazardous materials.

Dusty surfaces should always be wet mopped or cleaned with a HEPA filtered vacuum. Sweeping stirs up the dust and creates an inhalation hazard. This is particularly important with toxic dusts such as clays and pigments.

Dusty work areas should be cleaned on a regular basis (preferably daily).

Clean up wet floors and small spills immediately.

Store tools and equipment when not in use and keep them in good working order. Be neat. Pick up trip hazards and keep working and walking areas unobstructed.

**Use appropriate ventilation to reduce the level of airborne contaminants and prevent accumulation of flammable vapors.**

Be aware that floor fans or ceiling fans can sometimes stir up settled dust or cause air contaminants to be carried into a person's breathing zone. It's better to use exhaust ventilation to remove hot or contaminated air than it is to just use a fan to blow it around.

A common recommendation on product labels is "Use with adequate ventilation." This is a non-specific phrase that provides little information but it does indicate that the product may contain odorous or potentially toxic materials and that it should be used outdoors, in a large open area or with a local exhaust system (spray booth, fume hood, etc.).

If local exhaust or dilution ventilation systems are not working properly (e.g., if visible dust leakage or strong odors are noted), notify course instructor, discontinue work requiring ventilation until adequate exhaust can be restored.

**Handle and store equipment and supplies properly.**

Don't block access to emergency equipment (fire extinguishers, fire alarm stations, etc.)

Keep exit routes, aisles, and exit doors clear of obstructions.

Choose appropriate containers. Avoid breakable glass containers whenever possible and don't put chemicals in empty food or beverage containers.

Don't store incompatible chemicals in close proximity. Refer to SDS for information.

Store materials safely so they will not fall; don't store hazardous chemicals above eye level. Sharp edges or blades should be protected or enclosed to prevent accidental contact.

Make sure all containers are labeled with contents and hazard warning information in accordance with the Hazard Communication Standard.

Cover containers when not in use to prevent liquids from evaporating and powders from spilling.

Transfer materials carefully to avoid splashing or generating large amounts of dust.

**Wear appropriate clothing and personal protective equipment (PPE).** Refer to studio safety guides for specific information.

Avoid wearing jewelry, loose long hair, or loose clothing around mechanical equipment.

Wear non-synthetic (cotton) clothing when working with hot objects (welding, glass making). Polyester and other synthetic clothing is prohibited for hot work projects.

Minimize exposed skin and avoid bare midriffs when working with hazardous chemicals or hot objects.

**Do not go barefoot in art studios. Sandals and other open shoes should not be worn in the metal or wood shops, when handling or mixing plaster, or when moving lithography stones.**

Store PPE properly and keep it readily accessible.

**Be a responsible artist.** The information in this safety guide is designed to protect you, your fellow artists and the environment.

Follow the instructions of your instructor and teaching assistant. They are there to help you learn and ensure that you can do your artwork safely.

Do not use equipment if you are not authorized to do so, haven't been trained on it, or are uncertain about what to do. Follow posted instructions for equipment use. If you have questions, ask your instructor.

Report unsafe conditions or damaged equipment to your instructor or TA immediately. If necessary, take the equipment out of service or place a warning tag/label on it.

Recognize your physical, emotional and mental limits. Eat well-balanced meals and get plenty of rest each night. Do not operate mechanical equipment or power tools while under influence of drugs, alcohol or medication. Decreased alertness is a major cause of accidents.

Be considerate of the health and safety of the people around you and their activities. Communicate any known chemical or physical hazards that your project has the potential to create. Work safely and don't put others at risk.

***If you have any health or safety concerns related to VCUArts instruction, please discuss the issue with your instructor or teaching assistant. You can also contact (anonymously, if desired) VCU Safety and Risk Management (SRM) for assistance.***

## **Art safety references**

A lot of art safety information has been published or is available on the Internet. Check out other art schools or do a keyword search on “art safety.” Here are a few excellent art safety publications and websites:

*Health Hazards Manual for Artists*, Michael McCann, 6<sup>th</sup> ed., 2008, Rowman & Littlefield Publishers

*Artist Beware-The Hazards in Working with All Art and Craft Materials and the Precautions Every Artist and Craftsperson Should Take*, Michael McCann, 2<sup>nd</sup> ed., 2005, Rowman & Littlefield Publishers

*The Artist’s Complete Health and Safety Guide*, Monona Rossol, 3<sup>rd</sup> ed., 2001, Allworth Press

[www.artsandtheatersafety.org](http://www.artsandtheatersafety.org) Arts, Crafts and Theater Safety: a non-profit corporation providing safety and hazard information for the arts

[www.uic.edu/sph/glakes/harts/index.htm](http://www.uic.edu/sph/glakes/harts/index.htm) Great Lakes Centers for Occupational and Environmental Safety and Health, Occupational Health Service Institute, “Health and the Arts Program”

<http://sis.nlm.nih.gov/enviro/arthazards.html> *Keeping the Artist Safe: Hazards of Arts and Crafts Materials*, Enviro-Health Links, U.S. Department of Health & Human Services

# Appendix 1

## Studio safety hazards and precautions

### Ceramics

Hazards associated with ceramics are related to three aspects of the process: preparing and molding the clay, glazing, and firing the clay. There is also a concern about lead and other metals leaching into food and drink from pottery fired with certain glazes. Carefully review safety data sheets (SDS) for the products you use, especially for the glazing compounds.

Activity	Hazards	Precautions
Working with clay	Clays contains crystalline silica which can cause the lung disease silicosis. Some clay additives (talc) may be contaminated with asbestos and other hazardous contaminants. Handling/mixing clay in powder form can cause an inhalation hazard.	Review the SDS. Avoid creating dust (i.e., don't sweep, and work wet whenever possible). Use in well ventilated area. Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM
Handling glazes/frits	Glazes can contain free silica and highly toxic metals such as lead, cadmium and chromium, which can cause cumulative toxic effects. Handling/mixing glazes in powder form can cause an inhalation hazard.	Review the SDS. Avoid creating dust (i.e., don't sweep, and work wet whenever possible). Use fume hood whenever mixing. Any use of a NIOSH-
		approved N95 dust mask/respirator must be approved by EHS-SRM  Avoid spray application of glazes which can create aerosols
Firing kiln	Toxic gases and fumes (carbon monoxide, formaldehyde, etc.) may be emitted during the firing process as byproducts of combustion. Infrared radiation produced by the glowing fire can cause cataracts after long periods of exposure. Heat generated by a kiln or hot objects from a kiln can cause thermal burns. Heat can also cause fires in nearby combustibles.	Ensure exhaust ventilation is working. Wear shaded lenses when looking into a kiln. Wear leather gloves when handling hot objects. Do not store flammable and combustible materials near kilns.

### Other important notes:

Don't use kilns, mixers, or other pieces of equipment until you have been trained by a ceramics faculty member.\*

Substitute less hazardous clays and glazes whenever possible. (i.e., use lead-free glazes, use water as a vehicle for glazes instead of solvents, etc.) It's better for both you and the environment.

Wear non-slip shoes in the mixer area or other areas where wet floors may be present.

Use proper lifting techniques when handling large bags of clay or other heavy materials.

Wet mop floors and work surfaces daily to minimize dust levels and prevent dry scraps from becoming pulverized.

Wash your hands with soap and water after working with clay and glazes.

<https://ehs.princeton.edu/health-safety-the-campus-community/art-theater-safety/art-safety/ceramics>

<http://www.ceramicstoday.com/articles/080999.htm>

### Department of Craft/Material Studies – ceramics area

#### General safety

1. The ceramic studios, materials, and equipment are only permitted for use to students enrolled in ceramic area courses and senior critique courses with a focus in ceramics, who are a craft major and have taken a class in the area before, or are otherwise granted permission by the ceramics area lead faculty. These are rooms 226, 227, 228, 228A, 229, 230, 231, and 232.
2. All personal containers must be labeled.
3. Caution and common sense should be exercised when working around kilns, machines, and chemicals:
  - a. Where needed in unventilated areas, wear dust masks or respirators when working with dry, powdered materials.
  - b. Wear eye and ear protection when appropriate.
  - c. Sleeves must be buttoned or rolled up.
  - d. Long hair must be tied back or covered.
  - e. Only approved personnel and graduate students are permitted to mix clay.
4. Keep all areas clean. Good housekeeping, and clean and orderly work areas and equipment are fundamental to accident and fire prevention. Housekeeping is an ongoing process.
5. All accidents and incidents, including minor injuries, and all hazardous conditions are to be reported immediately to the instructor and to the safety coordinator.
6. Any equipment, including both gas and electric kilns, cannot be used without instruction in proper procedures, authorization and supervision.
7. **Do not** empty any clay into the sinks, or leave clay in the sinks—**ever**.
8. All tables are to first be scraped and then sponged down—**not swept**—to clean all clay and materials off the surface.
9. Any dry ceramic materials should be cleaned up with a sponge/mop and water.

#### Mixing clay

1. Permission must be obtained to make clay. Clay mixers and pug mills may be locked when not in use.
2. The exhaust system should always be turned on before making clay. Be certain that the door to the clay mixing room is closed to ensure the exhaust system works as designed.
4. A respirator is recommended and may be worn if you are tested and cleared.
5. Hair must be tied back or covered.
6. Sleeves must be buttoned or rolled up.
7. Do not wear loose clothing.
8. First add water to the mixer, close lid and turn on power.
9. Bags of clay should be emptied into mixer carefully and not shaken. When mixing clay, try to generate the least amount of dust possible.

10. Do not add any materials or place any objects (scrapers, sticks, etc.) or your hands into the mixer or pugger until the power is off and machinery has come to a complete stop.
11. Mixers should be cleaned to “good as new” standards, first using scrapers and then using water and a brush/sponge. This must occur after each use.
12. Areas around mixers and pug mills should be cleaned using a sponge or mop with water. Empty clay bags should be taken to the dumpster.
13. Return partially used bags of clay to proper area and turn off exhaust system when finished.

#### Pottery wheels

1. Do not plug or unplug electric wheel with wet hands.
2. Tie hair back before using pottery wheel.
3. Turn off switch after use.
4. Your wheel must be cleaned after use.
5. Area around wheel must be clean and all trimming scraps picked up.
6. Splash pans should be cleaned and put back on the wheel when finished. Do not leave splash pans in the sink.

#### Glazing areas

1. The exhaust system must be turned on when using the glaze mixing room to make glazes or weigh out dry materials.
2. All class glaze materials must be kept in glaze area. Keep containers covered.
3. It is recommended that masks be worn when handling potentially toxic dry materials in the glaze material storage room. Keep dust to a minimum.
4. The use of disposable gloves is recommended when mixing glazes.
5. Use stir sticks or blender in wet glaze buckets.
6. Do not pour glaze down the sink.
7. The spray booth must be turned on and used when spraying glazes. It is not to be used for any paint materials.
8. Keep glaze area/room clean.
9. Clean the glaze mixer and the area around the mixer before leaving the room.
10. Turn off the exhaust system when finished.
11. Remove personal items from the area.

#### Kilns

1. No graduate or undergraduate student may fire a kiln—gas or electric—without first getting loading and firing instructions.
2. When pulling spy hole plug:
  - a. Tie hair back.
  - b. No loose or nylon clothing.
  - c. Use gloves to pull spy plug.
3. Consult with faculty before attempting to fire a kiln that will contain combustible materials or burnout materials.
4. Be careful to avoid contact with the kiln exteriors because they are extremely hot during firing.
5. Combustible materials such as ware boards, notebooks, foam, etc., should never be left unattended in the kiln room.

#### Slab Roller

1. Do not use large or dry clay “chunks.”
2. Lay out small pieces of clay over the surface in the desired form before rolling.
3. Do not force the roller, which could snap the cables.
4. Do not sit or stand on the slab roller.
5. Use the appropriate canvas for the color of clay you are using. (i.e., red clay uses the red canvas).



### Extruder

1. Place dies properly into the device.
2. Do not place hard or stiff clay into the device.
3. Use consistent pressure to extrude the clay.
4. When finished clean everything inside and out, and place dies back into the proper storage container. Do not leave any clay in the extruder.
5. Place handle back in proper position
6. Remove all residual clay by hands or with a scraper.
7. Clean under and around the extruder when finished using a sponge/mop and water.

### Bench grinder

1. Only properly trained and authorized users are permitted to do abrasive bench grinder
2. You must wear safety glasses. A face shield is not a substitute for safety glasses, but should be worn in addition to safety glasses.
3. Keep working area clean.
4. Never use grinding wheel around flammable liquids
5. Do not wear loose clothing or jewelry.
6. Inspect before use for damaged parts, cut-off discs, cracked or damaged cords, and that all guards are in place.

### Angle grinder

1. Wear safety glasses. A face shield is not a substitute for safety glasses.
2. Never remove the guard. It can be rotated for optimum positioning.
3. Always use the auxiliary handle for maximum control over torque reaction and kickback.
4. Kiln shelves should be stable before grinding or wire brushing.
5. Grip the tool with both hands at all times.
6. No loose clothing.
7. Be very aware of people around you, ask them to give you space if you need it.
8. When finished, unplug tool and clean work area with a damp sponge or mop. All debris should be sponged from the table into a garbage can.

For further information see: <http://www.osha.gov/SLTC/etools/computerworkstations/index.html>

## Drawing/painting

Paints are pigments mixed with a vehicle or binder. Drawing media includes crayons, pencils, inks, felt-tip markers and oil pastels, as well as dust-creating media, such as charcoal and pastels, which are often fixed with spray fixatives. Hazards associated with painting/drawing are related to the pigments, solvents, varnishes, lacquers and binders or vehicles that pigments are mixed with. Some of these materials may cause allergic reactions in certain individuals; some materials may be carcinogenic or toxic by ingestion or inhalation and some may be absorbed through the skin. Accidental ingestion can occur due to eating, drinking, or smoking while working, and inadvertent hand-to-mouth contact. Carefully review safety data sheets (SDS) for the products you use and review specific hazard control measures.

Activity	Hazards	Precautions
Painting and solvent use	<p>Mixing dry powders and sanding can create inhalation and ingestion hazards.</p> <p>Some natural resins may cause skin irritation or allergies.</p> <p>Some solvents and vehicles used in paints can evaporate quickly and contaminate the air creating an inhalation hazard.</p> <p>Some solvents can be absorbed through the skin and can cause dermatitis with prolonged exposure.</p> <p>Many solvents are flammable.</p>	<p>Review the SDS.</p> <p>Mix dry pigments in a chemical fume hood. Avoid creating dust.</p> <p>Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM.</p> <p>Avoid skin contact with solvents.</p> <p>Wear nitrile gloves. Wash hands before eating, drinking or smoking.</p>
Spray application	<p>Airbrushes, and aerosol spray cans release very fine mist particles that can remain in the air for several hours and are readily inhaled.</p> <p>Aerosol spray paints and other products contain propellants that are extremely flammable. Spray application of some solvents and paints can create a flammable atmosphere.</p>	<p>Never spray solvent-based materials in or near the building except in designated spray booths.</p> <p>Use water-based airbrushing paints and inks rather than solvent-based.</p>

Drawing Media	<p>Dust from charcoal sticks, pastels, and colored chalks can cause problems for individuals with asthma.</p> <p>Pastels can contain toxic pigments which can be hazardous by inhalation or accidental ingestion. Spray fixatives contain toxic solvents and flammable propellants.</p> <p>Some drawing inks and permanent felt tip markers can contain solvents.</p>	<p>Don't blow off excess pastel or charcoal dust.</p> <p>Wet wipe or mop dusty surfaces.</p> <p>Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM</p> <p>Never spray fixative in or near the building except in designated spray booths.</p>
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**Other important notes:**

Do not use miter saw and other pieces of equipment until you have been trained by a faculty member.\*

Substitute less hazardous materials whenever possible. (i.e., use lead-free paints, use water-soluble materials instead of solvents, etc.). It's better for both you and the environment.

Avoid use of pigments which contain toxic metals such as lead, cobalt, cadmium, chromates, mercury, etc.

Hazardous metal fumes may be produced when coated surfaces are heated or burned.

Do not use solvents to clean skin; remove paint from your skin with baby oil then use soap and water.

Wash your hands with soap and water after working with painting and drawing materials.

**\* Observe posted instructions and procedures for the following:**

Solvent and fixative use

Miter saw operation

## **Glass**

There are a number of hazards associated with glassmaking: burns, razor sharp objects, hazardous chemicals in glass, exposure to heat, carbon monoxide from incomplete combustion and eye damage from optical radiation and flying glass. Carefully review the safety data sheet (SDS) for the products you use.

<b>Activity</b>	<b>Hazards</b>	<b>Precautions</b>
Hot work (working with molten glass, hot objects and heat sources)	Burns Clothing can melt or catch fire. Prolonged work in a hot environment can cause heat stress (heat exhaustion). Hot glass can release toxic gases and metal fumes.	Wear Kevlar gloves when handling hot objects. Be careful not to grab hot objects (wrong end of punty). Wear cotton or wool clothing, including underwear (not nylon or polyester). Drink plenty of water and take breaks as necessary. If desired, wear a heat resistant face shield in addition to eye protection.
Cold work (handling glass powders, colorants, grinding glass, blasting)	Glass (especially colors) can contain heavy metals (lead, cadmium, arsenic, etc.) that can be poisonous if inhaled or accidentally ingested. Sand contains crystalline silica which can be an inhalation hazard.	Review the SDS. Use the least hazardous materials whenever possible. Avoid creating dust (use wet process, blasting cabinet, etc.) Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM
Looking into furnace or glory hole	Optical (infrared) radiation from the glowing fire can cause cataracts and other eye damage.	Wear tinted eye protection (minimum #3 welders shade). NOTE: Sunglasses <u>don't</u> protect against infrared radiation.
Glass handling, glass recycling, glass crushing	Cracked and flying glass can form as glass cools. Glass can cut or puncture or cut skin.	Wear safety glasses. Wear cut-resistant gloves.
Operation of gas burning equipment	Carbon monoxide can be produced if flame in furnace or pipe warmer is not burning properly. Gas leaks. Use of lighter fluid on torches.	Do not use equipment if not properly trained. Make sure good ventilation is provided. Periodically inspect all gas line connections with soapy water. If gas odor is noted, turn off gas supply and check for leaks.  Never pour lighter fluid directly on a hot or burning object. Store containers of lighter fluid away from sources of ignition.

### **Other important notes:**

- Do not use furnaces or other pieces of equipment until you have been trained by a faculty member.\*
- Wear appropriate eye protection. If your eyes hurt, you should be wearing more eye protection.
- Wear natural fiber clothing and sturdy shoes or boots.
- Remove watches and jewelry. Tie back long hair.
- Remove butane lighters from pockets when working around furnace and other heat sources.
- Dispose of hot glass properly. Never dispose of hot glass with regular trash.

**\* Only operate the following equipment after instruction from a faculty member**

- |                      |               |
|----------------------|---------------|
| • Glory hole         | Torches       |
| • Pipe warmer        | Glass lathe   |
| • Garage             | Wet saw       |
| • Wet Grinding wheel | Cane cutter   |
| • Wet Belt sander    | Glass furnace |
| • Sand blaster       | Casting kilns |
| • Annealers          | Fusing kiln   |

**Department of Craft/Material Studies – Glass Area**

**General safety**

- The glass studios, materials, and equipment are only permitted for use to students enrolled in glass area course credits, Senior Critique course credits with a focus in glass, craft majors who have taken a class in the area before, or those granted permission by the glass area lead faculty. These are rooms 218m 220, 220A, 221, 222, 222A, 222B, 222C, 223, 224, 225, and 229.
- Eye protection **must** be worn **at all times** in the hot shop and cold shop. There are **no** exceptions.
- Proper clothing in a glass studio:
  - Natural fiber clothing (cotton, wool). **No synthetics.**
  - Long pants; no shorts or skirts.
  - No opened-toed shoes: sandals, clogs, etc.
  - Leather shoes preferred.
  - No dangly, loose jewelry.
  - Long hair must always be tied back (at all times).

Do not attempt to operate any piece of equipment that you have not been properly trained on.

**Hot shop safety**

- Eye protection must be worn **at all times** in the hot shop. No exceptions.
- Recommended proper clothing: Natural fiber clothing (cotton, wool). **No synthetics.** Long pants; no shorts or skirts. No tights/leggings (they're usually synthetic). No opened-toed shoes, sandals, clogs, etc.; leather boots/shoes, with thick soles, are preferred. No dangling, loose jewelry. Long hair must be tied back at all times.
- It is recommended to never work alone in the hot shop.
- Keep the floor clean of broken glass. Broken shards of glass are nearly the sharpest objects on earth, sharper than a surgeon's scalpel. Broken glass on the floor is an extreme hazard: it is slippery, and can cause someone to lose their footing, and if someone does fall on it they can be seriously cut and injured. There is no excuse for broken glass left on the floor. If you see glass shards immediately use the corn brooms (natural fibers that won't melt) to sweep them up and toss into the appropriate bin (colored glass in "dead glass" and clear in "clear").
- Music must be kept to a reasonable level. You must be able to clearly and safely communicate with your partner(s) and fellow glassworkers.
- No headphones or earbuds.
- Use Kevlar gloves and face masks to safely put the finished work away.
- **Always wear a dust mask** when sweeping/vacuuming out the ovens.
- **Always wear a dust mask** when emptying clear glass into the recycling bin or disposing of dead glass in the dumpster.
- Note that all metal equipment and tools can be hot at any time. Test items before touching by holding hand nearby to feel for radiant heat.
- Burns: If you do get burned do not ignore even the most minor, as they frequently turn out to be worse than they first appear. Basic first aid: run cold water over the burn for at least 5 minutes and ice the surface. If the burn is at all serious, go to the health center. If you are burned while working, stop and take care of it. You are more important than the glass.
- Do not attempt to operate any piece of equipment that you have not been properly trained on.
- Non-glass students are **never allowed** to use the hot shop.
- **Always** announce yourself when approaching someone working with hot glass.
- **If you have any doubts at all about how to light the glory-holes, the garage, turn the annealing ovens up or down, or turn the furnace up or down, please ask for assistance from the graduate students or the faculty.**

**Cold shop safety**

- Eye protection must be worn **at all times** in the cold shop.
- **All long hair** must **always** be tied back.
- No loose-fitting clothing should be worn when utilizing the machinery.
- **Caution: broken glass is sharp.** Molten glass can be scary, but broken glass is far more dangerous. The human nervous system will instantaneously pull away from a hot surface, often involuntarily. So, it's nearly impossible to continue to burn yourself with hot glass. Most burns in the hot shop are superficial at worst. By contrast, broken glass can cut you. Cuts cause bleeding—which opens the body to infection—and can cause the victim to faint from the mere sight of blood, causing far worse injury from a fall onto a concrete floor. Moreover, cuts can occur on major arteries and put the victim in danger of blood-loss. Therefore, great care should be taken when working with cold glass.
- It is not recommended to cold work while tired or sick.
- It is not recommended to cold work alone (there should at very least be someone in the hot shop).
- Do not startle someone who is cold working.
- Hearing protection should be worn and is highly recommended whenever any equipment is in use in the cold shop.
- Ear plugs are located on top of the cold shop cabinet.
- Earmuffs can be found hanging throughout the cold shop and should remain next to appropriate equipment on designated hangers (e.g. next to the diamond saw(s), belt sander and sand blaster(s)). Dust masks or respirators—if you have been fitted—are highly recommended whenever there is airborne glass dust, when using: diamond saw(s), pneumatic die-grinders, belt sanders and sand blasters, diamond lap wheel, pneumatic/water angle grinder.
- Be cautious of wet floors. Almost all equipment in the cold shop uses water. This means that the floors are very often wet and can be slippery. Caution should be used anytime you are working in or moving through the cold shop. In event of excess water, please squeegee water into nearest drain immediately/ Squeegees can be found hanging throughout the cold shop. Mop up water residue with mop.
- Clean and remove **all glass dust.** Cold working equipment grinds glass to create a tenacious dust that is composed mostly of amorphous silica. This dust can be invisible when wet but obvious as a white film when dry. Although less dangerous than crystalline silica, amorphous silica dust is classified as hazardous substance and is controlled by OSHA guidelines. All glass/silica dust must be cleaned off all surfaces after each use of any machine or work area. Failure to do so will result in docking of participation grade and, if it continues, revocation of cold shop access.
- Double check that a continuous flow of water is running when cold working the glass, as the water serves four purposes: 1. To flush away the slurry that can gum up the diamond abrasive surfaces. 2. To cool the metal substrate that contains the industrial diamonds. 3. To saturate the silica particulate so that it falls to the floor and does not stay airborne and so reduces its' inhalation. 4. The most important thing is for the water to cool the glass that is being cut, polished, and abraded, keeping it from being thermal shocked and breaking/exploding in your hands.
- When employing the air line to dry the surface of the glass that is being worked on: **never** blow pressurized air into a mostly sealed form, as this can often cause the form to explode violently.
- Never use equipment you have not been trained on.
- **If you have any doubts at all about how to start, use, or stop a piece of cold-working machinery ask for assistance from the graduate students or the faculty.**

## Photography

Taking photos is the safest part of photography but there are many chemical hazards in the developing process. Some of these chemicals may cause allergic reactions in certain individuals; some may be carcinogenic or toxic by ingestion or inhalation and some may be absorbed through the skin. Accidental ingestion can occur due to eating, drinking or smoking while working, and inadvertent hand-to-mouth contact. Do Not eat or drink anything while inside the darkroom. Carefully review safety data sheets (SDS) for the products you use and review specific hazard control measures.

Activity	Hazards	PRECAUTIONS
Photo processing	Some processing chemicals are skin irritants or sensitizers and inhalation or dermal contact can cause adverse reactions such as allergic contact dermatitis, skin rashes, or permanent sensitization.	Review the SDS. Avoid skin contact with chemicals. Use tongs and wear appropriate clothing and PPE. Know where the nearest eyewash station is located. Wash hands before eating, drinking, smoking.
	Some processing chemicals emit a variety of respiratory irritants (acetic acid, formaldehyde, hydrogen sulfide, sulfur dioxide, etc.). Exposure to these irritants can cause increased susceptibility to respiratory infections.	Always mix concentrated solutions in a fume hood. Keep working solutions covered when not in use. Make sure local and dilution ventilation systems are working properly.
	Many chemicals used in photo processing are highly toxic if ingested.	Wash hands before eating, drinking, smoking. Don't put processing chemicals in food or drink containers.
	Highly irritating and toxic substances can be produced and become airborne if stock or working solutions are mixed with incompatible materials.	Do not mix stock solutions with incompatible materials. Store incompatible materials separately. Label all containers.
	Water and other liquids may be used in the vicinity of electrical equipment.	Separate electrical equipment from water sources. Install ground fault circuit interrupters on all electrical outlets within 5 feet of water source.

### **Other important notes:**

- Don't use processing chemicals and equipment until you have been trained by a faculty member.\*
- Substitute less hazardous materials whenever possible. It's better for both you and the environment.
- Work in well-ventilated areas.
- If local and dilution ventilation systems are not working properly, notify course instructor.
- Dispose of waste chemicals properly. Contact course instructor or SRM for assistance.
- Find out where the nearest emergency eyewash station is located.
- Wash your hands with soap and water after working with processing chemicals.
- Closed-toe shoes are required in the darkroom at all times.

### **\* Observe posted instructions and procedures for the following:**

- Standard B&W film developer
- Archive fixer remover
- Record speed fixer
- Block stop bath
- Quicksilver print developer

## Printmaking/lithography

Hazards associated with printmaking relate to chemicals found in inks, pigments, solvents, acids, adhesives and other materials that may be used. Some of these materials may cause allergic reactions in certain individuals; some materials may be carcinogenic or toxic by ingestion or inhalation and some may be absorbed through the skin. Accidental ingestion can occur due to eating, drinking, or smoking while working, and inadvertent hand to mouth contact. Carefully review safety data sheets (SDS) for the products you use and review specific hazard control measures.

Activity	Hazards	Precautions
Use of inks, pigments, solvents (mineral spirits, alcohol, etc.)	Some solvents and vehicles used in paints can evaporate quickly and contaminate the air creating an inhalation hazard. Some solvents can be absorbed through the skin and can cause dermatitis with prolonged exposure. Many solvents are flammable.	Review the SDS. Mix dry pigments in a chemical fume hood. Avoid creating dust. Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM Avoid skin contact with solvents. Wear chemical resistant clothing (apron, gloves). Wash hands before eating, drinking, smoking.
Acid handling (typically small amounts of glacial acetic acid and nitric acid)	Contact with acids can irritate skin and mucous membranes and can cause chemical burns. Acid spills can damage clothing and equipment.	Always wear chemical splash goggles and neoprene gloves when handling acids. Only authorized persons are allowed to mix acids. Mix acid solutions in the fume hood.
Moving lithography stones	Back injuries may occur from lifting heavy stones.	Use mechanical lift or get help when moving stones larger than 12 inches in diameter.
Use of non-powered hand tools	Sharp or pointed tools can cause cuts or puncture wounds. Frequent and prolonged use of hand tools can cause carpal tunnel syndrome.	Cut away from the body and keep hands clear of blade. Store tools safely; protect sharp edges or blades when not in use. Use ergonomically designed tools that fit the hand well.

### Other important notes:

Don't use presses until you have been trained by a faculty member.\*

Substitute less hazardous materials whenever possible. It's better for both you and the environment.

Dispose of waste properly.

Don't put paints or solvents in food or drink containers.

Remove paint from your skin with baby oil or soy-based cleansers then use soap and water. Don't use solvents to clean skin.

- Wash your hands with soap and water after working with painting and drawing materials.

### \* Observe posted instructions and procedures for the following:

Presses

Lithography



## Metalworking

The hazards associated with metalworking depend on the type of work performed and methods used. Artists may weld, braze, solder, or torch cut metals as well as cast or forge them. Melting metal can produce toxic gases as well as metal fumes (very small particles that can penetrate deep into the lungs). Carefully review safety data sheets (SDS) for the products you use and identify the hazardous materials in them.

ACTIVITY	HAZARDS	PRECAUTIONS
Metal casting (mold making, removing molds)	Sand has a high silica content which can become airborne during mold handling and create an inhalation hazard. Some resins are moderately toxic by skin contact and inhalation.	Review the SDS. If possible, avoid using formaldehyde and polyurethane resins in molding sand. Use silica-free sand. Mix molding sand in well ventilated area (preferably with local exhaust ventilation). Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM
Metal casting (melting and pouring metal)	Toxic metal fumes can be produced. Welding and furnaces can generate combustion gases (carbon monoxide). Furnaces release a lot of heat and infrared radiation that can lead to heat stress, skin burns, and eye damage. Molten metal can burn organic resins and binders in the sand mold and release toxic decomposition products.	Review the SDS. Work in a well-ventilated area. Be sure exhaust ventilation system on furnace is functioning properly. Work in pairs when pouring molten metal into molds. Never pour directly over cement or water.
Metal forging	Shaping hot or cold metal with hammers can generate high noise levels and potential crushing injuries. Molten metal can cause severe burns.	Wear eye and hearing protection. Wear heat resistant gloves and other protective clothing. Be sure tools are in good condition.
Welding, brazing, soldering	A number of air contaminants are produced including toxic metal fumes and gases (ozone, oxides of nitrogen, carbon monoxide). Base metals that are coated with paint can release toxic materials when heated. Base metals such as stainless steel or galvanized steel can release highly toxic fumes (zinc, chromium). Welding can produce ultraviolet and infrared radiation. Heat and slag can cause serious burns and fires.	Review SDS for base metals, welding rods, flux, etc. If possible, avoid using metals that contain lead, zinc, nickel, chromium and other toxic metals. Remove any preservative coatings from base metal before welding or cutting. Work in a well ventilated area. Any use of a NIOSH-approved dust mask/respirator must be approved by EHS-SRM Wear shaded eye protection. Wear natural fiber clothing, sturdy close-toed shoes, leather gloves and other protective clothing,

<p>Operating mechanical equipment</p>	<p>Improper use of equipment can cause injuries. Clothing, hair, fingers can get caught in moving equipment.          Damaged electrical cords, plugs and switches can cause fires or electrical shock.          Prolonged exposure to high noise levels can cause hearing loss.          Extended use of vibrating hand tools can cause damage to the muscles and tendons in the hand.</p>	<p>Don't use equipment without prior training.          Keep guards in place.          Use push sticks.          Always turn equipment OFF when making adjustments.          Remove watch, jewelry, and tie back long hair.          Wear appropriate PPE (eye protection, hearing protection, etc.)</p>
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**Other important notes:**

- Don't use equipment until you have been trained by a faculty member.\*
- Substitute less hazardous materials whenever possible.
- Never store or use chlorinated hydrocarbons or flammable materials in the welding area.
- Use a welding curtain to shield your work from others.
- Don't let molten metal come in contact with water, grease, oil or other organic materials.
- When finishing working or leaving the studio, wash hands thoroughly.
- Take the time to clean all shared tools and spaces as you go and once you are finished working.

**\* Observe posted instructions and procedures for the following:**

- Metal shop rules
- Bench grinder
- Abrasive cut-off machine (chop saw)
- Drill press
- Electric welders (Arc/TIG/MIG/plasma)
- Forge cutter
- Natural gas furnace
- Oxy-acetylene (gas) welding/cutting
- Sand mixer
- Angle grinder
- Trip hammer
- Band saw

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**Sculpture Department metal shop guidelines**

- You must give your shop card to a monitor before beginning work in the metal shop area.
- Suitable gloves (leather) should be used for handling hot or sharp-edged items.
- **Never** wear gloves when operating metal rollers.
- **Never** use a rag near moving machinery.
- **Never** cut or weld on an enclosed container.
- **Never** wear headphones in the shop area.
- Cell phone use is only allowed in the shop in the case of an emergency.
- **Always** select the machine that will do the operation the best, easiest, and safest way.
- Carry cutting tools with sharp edges down.
- Everything in the metal shop should be considered **hot**. Check before grabbing materials or tools.

## **Sculpture Department foundry guidelines**

- **Never** wear gloves when operating metal rollers.
- **Never** use a rag near moving machinery.
- **Never** wear headphones in the shop area.
- Flame-resistant clothing and gloves must be worn to protect from sparks.
- Cell phone use is only allowed in the shop only in the case of an emergency.
- Everything in the foundry should be considered **hot**. Check before grabbing material and tools.
- Hearing protection, dust masks rated n95, and vapor respirators will be required at various times.
- Wear n95 mask when working with sand and cleaning the sand muller.
- Wear chemical gloves and chemical goggles when pouring sand chemicals.
- Double-check and be sure of the correct ratio of resin to catalyst and never mix the two.
- Never operate the sand muller alone, and do not place unauthorized tools or materials in the muller.
- Remove all tools and debris from the sand muller before the power is turned on.
- Use correct posture, and lift sand and molds with the provided lifting table and/or a partner.
- Ensure tables for molds are sturdily set up and will not collapse.
- Replace all sand tools when finished and clean the inside of the muller and surrounding area.

## **Department of Craft/Material Studies – metals area**

### **General safety**

- The metal studios, materials, and equipment are only permitted for use to students enrolled in metal area course credits, senior critique course credits with a focus in metals, craft majors who have taken class in the area before, or those granted permission by the metal area lead faculty. These are rooms 206, 206A, 207, 207A, 208, 209, 209A, 209B, 209C, 209D, 209E, and 209F.
- All flammable and combustible liquids and gases must be stored in the flammable cabinet when not in use. After class, or any work sessions all flammables and combustibles must be returned to flammable cabinets. Lockers or open shelves are not acceptable storage for flammable or combustible liquids or gases. **No exceptions.**
- Closed toe shoes are required in all Metal area studios.
- It is recommended that long hair be tied back and kept in a secure manner when working in the metals studio.
- It is recommended that loose, flowing clothing and jewelry be tied back and kept in a secure manner when working in the metals studio.

### **A. Etching**

1. Etching chemicals are only to be used by students who have been trained in how to use them.
2. Protection: Always wear mandatory health and safety equipment, including: goggles/safety glasses, and gloves.
3. When in doubt concerning proper usage of the ferric chloride or ferric nitrate, consult the SDS.
4. All etching is to be conducted in the large chemical basin sink. When small spills occur, the etching solution (ferric chloride or ferric nitrate) can be neutralized with baking soda and cleaned up with paper towels and cold water. Be courteous to your fellow students by leaving a clean working area.
5. When in doubt, consult with an instructor on the proper use of the equipment/chemicals.
6. There are hazardous chemicals stored in this room that can cause harm when improperly used. Do **not** use any equipment or chemicals that you are not familiar with.
7. Chemical storage: There are numerous types of mild acids and chemicals that are not compatible. All containers and funnels must be thoroughly rinsed and dried prior before and after use. It is the users responsibility that the chemicals that they use are returned to the original container, resealed, and that the container label identifying contents is readable and up-to date and lists their name, the date, and the name of chemical.

8. It is recommended that ventilation be used when working with chemicals in the chemical room.
9. Skin and eye irritation can occur when using mild acids located in this room. If acids come in contact with skin wash the area with soap and water. If acids come in contact with eyes rinse eyes in the eyewash station for 15 minutes. If irritation persists, seek medical attention.

### **B. Flammables**

The following chemicals and gases are used in the studio lab on a routine basis. These materials when exposed to flame can catch fire. Extreme care should be exercised at all times when dealing with these gases/chemicals.

1. Denatured alcohol, acetone and turpentine: Do not pour alcohol or turpentine at the work or soldering stations. Do not store alcohol lamps with alcohol in them.
2. Flammable gases (natural gas, acetylene) are located at the soldering stations, annealing stations, and casting stations. Do not trap or contain gases in a hollow container or form. This could result in an explosion. Always utilize these gases through the control of torch handles, etc.

Storage locations of chemicals/gases is as follows:

- Denatured alcohol: stored in yellow flammables cabinet
- Acetone: stored in yellow flammables cabinet
- Turpentine (paint thinner) – stored in yellow flammables cabinet
- Natural gas: can only be used in conjunction with torch handles and tips
- Acetylene: can only be used in conjunction with torch handles and tips

In the event of a fire mishap, use the fire extinguisher on object or people to put out flames. The emergency showers may also be used to extinguish flames on clothing, hair, etc.

### **C. Mechanical or physical**

1. When operating mechanical equipment or soldering safety glasses must be worn.
2. It is recommended that long hair be tied back and kept in a secure manner, away from moving parts of equipment, so as not to get caught or snagged, causing injury.
3. It is recommended that loose, flowing clothing and jewelry be tied back and kept in a secure manner, away from flames and mechanical equipment.
4. When working with airborne materials such as sprays, mists or dust, the studio lab ventilation systems and/or the proper respirator is recommended. To wear a respirator you must be medically tested and fitted.

### **D. Buffing equipment**

1. Buffing machinery is potentially dangerous equipment if not properly operated. Long hair and loose clothing or jewelry should be tied back and secured.
2. Eye protection is mandatory.
3. No gloves should be worn while using the buffer.
4. The vacuum system must be turned on when machine is being used.
5. Buffer and surrounding area should be thoroughly cleaned after use.

### **E. Rolling mills**

1. The rolling mills are potentially dangerous pieces of equipment because it has the potential to crush or pinch fingers when used improperly.
2. It is recommended that long hair be tied back and kept in a secure manner, away from moving parts of equipment, so as not to get caught or snagged, causing injury.
3. It is recommended that loose, flowing clothing and jewelry be tied back and kept in a secure manner, away from mechanical equipment.
4. Students should not force fingers into the rolling mill platens.
5. No steel or ferrous metals should be rolled through the rolling mills.
6. No wet materials of any kind are allowed in the rolling mills. Organic materials, etc., should be thoroughly dried prior to rolling. If in doubt concerning a rolling material, please consult the instructor.
7. Upon completion, rolling mill and surrounding area must be thoroughly cleaned of debris.

### **F. Sandblaster**

1. The sandblaster is a potentially dangerous piece of equipment if used improperly.
2. Never operate the sandblaster with the door open.
3. Always latch the door firmly closed.
4. Always aim the sandblaster nozzle away from the window.
5. Vacuum/ventilation should be turned on when sand blaster is in use.
6. Safety glasses and dust mask/respirator are recommended when operating sandblaster.

### **G. Hydraulic press**

1. The hydraulic press is a potentially dangerous piece of equipment if used improperly.
2. Eye protection when using this piece of equipment is mandatory. There is a potential for blowouts caused by the extreme pressure.
3. Hydraulic press should never be fully extended.
4. Never exceed pressure of 10,000 psi.

### **H. Band saw**

1. The band saw can be a potentially dangerous piece of machinery if not handled correctly.
2. Safety glasses are mandatory.
3. It is recommended that long hair be tied back and kept in a secure manner, away from moving parts of equipment so as not to get caught or snagged, causing injury.
4. It is recommended that loose flowing clothing/jewelry be tied back and kept in a secure manner, away from mechanical equipment.
5. Fingers must be kept away from the blade.
6. The blade guard **must** be engaged at a level appropriate for the material/s being cut. The guard should only be high enough to allow material to pass through.
7. Upon completion, saw and surrounding area must be thoroughly cleaned of debris.

### **G. Sander**

1. The sander is a potentially dangerous piece of equipment if used improperly.
2. Safety glasses are mandatory.
3. It is recommended that long hair be tied back and kept in a secure manner, away from moving parts of equipment, so as not to get caught or snagged, causing injury.
4. It is recommended that loose flowing clothing/jewelry be tied back and kept in a secure manner, away from mechanical equipment.
5. It is recommended that users wear a dust mask/respirator when operating this equipment.
6. Do not operate the sander with your face on the same level as the belt, in case the work flies off the belt.
7. Upon completion, sander and surrounding area must be thoroughly cleaned of debris.

### **H. Drill press**

1. Drill presses can be potentially dangerous machinery if not handled correctly.
2. Safety glasses are mandatory.
3. It is recommended that long hair be tied back and kept in a secure manner, away from moving parts of equipment, so as not to get caught or snagged, causing injury.
4. It is recommended that loose, flowing clothing and jewelry be tied back and kept in a secure manner, away from mechanical equipment.
5. When using the large drill press, the work should be pinned with vises and c-clamps to the bed of the drill.
6. When using the large drill press, be wary of kickback. Never try to stop a piece of material that has been snagged by the drill. Simply turn the machine off and stand back until rotation ceases.
7. Upon completion, drill press and surrounding area must be thoroughly cleaned and free of debris.

### **I. Metal shears**

1. Keep hands and foreign materials away from the table.
2. Only cut sheet brass, copper, or silver. No tubing, wire or steel.
3. Do not cut anything thicker than 16 gauge metal.

4. Never force sheet metal shears.
5. Be mindful of the location of your fingers when using the shears.
6. Upon completion, shear and surrounding area must be thoroughly cleaned and free of debris and metal slivers. Scraps will be placed in appropriate scrap bins.

#### **J. Flex-shafts**

1. The flex-shafts are potentially dangerous pieces of equipment if used improperly.
2. Long hair, loose clothing and jewelry should be pulled back and secured.
3. Eye protection is mandatory when using this equipment.
4. If using flex-shaft for sanding, grinding or polishing, a dust mask/respirator is recommended.
5. When working with the flex-shaft as a drill, you must have your piece on top of a piece of scrap wood so that you do not drill into the table. Do not drill directly into the table. Use a lubricant when using flex-shafts as a drill or with a burr in order to help prevent drill bit breakage/snapping or burr from burning out.
6. Your flex-shaft motor may be operated in a vertical or horizontal position, but it should not be enclosed or confined so as to restrict air circulation. If the motor is hung above a workbench, be sure it is fastened securely to the wall or motor hanger. The motor may develop a high operating temperature (up to 100°F, plus ambient) after prolonged use, and it will be too hot to hold. This will not harm the motor, which is designed to operate at this temperature for prolonged periods.
7. Do not force the tool. Let the speed of the tool do the work. Avoid using too much pressure at too high of a speed.
8. Clean up the area after using the flex-shafts. Tables, floors, and flex-shaft machinery must be free of all debris.

#### **K. Hammering stakes**

1. Most raising stakes are extremely heavy and compose a significant risk to toes, feet and legs.
2. Do not get water on stakes, make sure metal and hammer are bone dry.
3. Stakes should not be hit directly with steel tools.

#### **L. Hammers: standard and raising**

1. Eye protection is recommended.
2. Use the right hammer for the job. Gray-handled hammers and mallets may be used on any metal, including steel tools. Blue-, purple- and green-handled hammers may only be used on nonferrous metals.
3. Check the hammer before use. Look for firm attachment of the head to the handle. Check for splinters, loose wrapping or other defects in the handle. If the hammer has any defects or is wobbly, **do not use**. Prior to hammering, ensure the area is free from hazards. If others are helping, ensure that effective communication is maintained.
4. Keep your wrist straight and use your whole forearm to lift and drop the tool.
5. Let the hammer do most of the work, using its weight and bounce back to move the metal, rather than pounding on it with your full force.
6. Metals, tools, hammers and surfaces should be moisture-free to prevent rust.

#### **M. Lapidary machine**

1. Always wear safety glasses.
2. Keep the rock dust wet at all times until it is disposed of.
3. Always keep the wheels lubricated with water.
4. Wipe everything down after use.
5. Scrape mud/residue out of pan and into the trash, then wash the pan. Never wash the mud down the sink.
6. The diamond saw must be kept wet when in use.
7. Never force equipment; it will ruin the machine.
8. It is recommended that long hair be tied back and secure when using this equipment.
9. It is recommended that loose clothing and jewelry be secured when using this equipment.
10. If at any time there is a problem with the equipment, immediately stop and report the issue to the instructor or graduate student. Never continue to use the equipment.

## N. Patinas

1. All commercial patinas must be used in compliance with manufacturer's health and safety directions. Generally, rubber gloves are recommended while applying patinas.
2. Disposal of these chemicals must comply with manufacturer's material safety data sheets (SDS).

## O. Investment

1. Find a partner to assist you with the casting process. Pick a date when both of you can be in the studio.
2. Make sure your wax is finished and looking **exactly** how you want it to look and how you anticipate it looking in metal. Remember that the slightest mark is magnified in metal and can mean hours of grinding.
3. Weigh your wax and record the weight in your notes.
4. Sprue: Rule of thumb is to sprue to the largest part of the wax. Straight and smooth transitions are important. Make sure your connections are strong.
5. Select rubber bottom and flask: Make sure you have the smallest flask for the job. Remember you need ¼ inch of space between the wax and the sides of the flask and ½ inch between the wax and the bottom. If you have less than these amounts you can have a blowout during casting. **If you are casting a large piece** (bigger than 1"x1"x2") you will need to use the vacuum caster. Select the perforated flask for this process. Additionally, for models requiring more than 3 ounces of metal you will need to use the electric melting pot which will also require you to use the vacuum caster. Plan accordingly.
6. Mount your wax to the rubber bottom using soft wax.
7. Coat wax with de-bubbler and allow to dry.
8. Put the flask onto the rubber base making sure you push down on the flask to create a seal.
9. Add the red rubber sleeve for investing.
10. Follow investment instructions **carefully and thoroughly**.
11. Scratch your initials and wax weight to the top of the solidified investment and **remove the rubber bottom**. Clean and put it away.
12. Allow to sit for 4 hours.
13. Burnout: Make sure if selecting your own kiln program that you choose the right one for your flask. At the highest temperature, 1,300°F, you must hold the kiln 1 hour per inch of the flask diameter. If you need help, ask your professor or graduate student. Make sure to see the program schedules and understand when your burn out will be completed.

## P. Casting

1. Safety glasses must be worn when casting.
2. It is recommended that long hair be tied back and secured when casting.
3. It is recommended that loose clothing and jewelry be secured when casting. Long sleeves, cotton shirts, and aprons are encouraged.
4. Centrifugal casting is only for flasks smaller than 4 inches in diameter
5. Turn on the machine.
6. Select the cradle appropriate for the flask you have.
7. Select the appropriate crucible for the metal you are melting and put your metal in.
8. Balance the arms by bringing your flask from the kiln onto the cradle.
9. Tighten the bolts, located in the center, around the weights, underneath the crucible holder.
10. Bend the arms so they are at a right angle to each other.
11. Light the torch, melt the metal.
12. Close the lid while holding the torch to the metal. Remove the torch right as you close the lid.
13. Allow the spinning to come to a complete halt before opening the lid.
14. When vacuum casting it is optimal to use perforated flasks.
15. Select the right rubber O-ring/seals for the flask you are using. Remember to place a wet paper towel between the rubber and your flask to help the seal and preserve the rubber.
16. Melt your metal while the assistant brings over the flask.
17. Turn on the vacuum and make sure the pressure is rising and the lights are on yellow.
18. When the metal is melted, hit the foot pedal and pour the metal. Timing is critical here; don't pour the metal before you hit the pedal or the pressure won't pull the metal into the flask.

19. Turn off the machine after a few seconds, remove the flask and set on the floor to cool.

#### **Q. Compressed gases**

1. Torches at the soldering station must be turned off at the end of each day in order to avoid an explosive fire hazard.
2. Studio monitors and graduate students must understand that when not properly used the compressed tanks are potentially deadly. They can act as projectiles and can explode if they are mishandled. They should never be unchained and should be treated with the utmost respect. If a graduate student is not 100 percent confident, they should **never** attempt to change the tanks. This activity is reserved for the most experienced and approved graduate students.
3. If there is any issue with the gas, report it to the RI, instructor or studio technician.

#### **R. Soldering**

1. Soldering is a potentially dangerous activity if done improperly.
2. Wear safety glasses when soldering.
3. It is recommended to tie back long hair and secure loose clothing and jewelry when soldering.
4. Ventilation system must be on when using any of the torch stations.
5. Operate the torch in a responsible manner so as not to burn yourself or others. Keep flammable materials away from the soldering area.
6. Be courteous to your fellow classmates; clean up the area after soldering.
7. Return all torch tips, pumice pans, strikers, bricks, etc. to the appropriate areas.

#### **S. Kilns**

1. Working with a burnout kiln is a potentially dangerous activity if used improperly.
2. When in use, kilns are extremely hot and can cause severe burns.
3. Whenever the burnout kilns are in use, the ventilation system must be on.
4. There must be a safeguard buddy system in place. Kilns may never be left unmonitored for more than 24 hours.
5. Enamel kilns should not be left unattended. If you turn the kiln on or are using it, it is your responsibility. Enameling kilns should be turned off at the end of every day. Never leave an enameling kiln on overnight.

#### **T. Sodium Bisulfate (Pickle)**

1. Sodium bisulfate, aka Pickle, is a potentially dangerous acid if not properly used.
2. Consult the material safety data sheet (SDS) for safety hazards, safe usage; spill cleanup and disposal of sodium bisulfate.
3. Make sure there is an adequate supply of baking soda available to neutralize the acid if there are spills, drips or mishaps.
4. Acid drips on clothes can be neutralized with baking soda.
5. Pickle should be disposed of in the hazardous waste bin located in the chemical room. Pickle should be room temperature when disposed of.
6. It is recommended to avoid putting steel in the pickle, as this will cause copper plating.
7. It is recommended to rinse pieces in the neutralizing bath and then the rinse bath after the piece comes out of the pickle.
8. Do not place baking soda in the pickle, as this will neutralize the bath.
9. The crockpots for pickle should only be turned on to the lowest setting (never high).
10. Pickle pots should be turned off at the end of every day. Never leave pickle pots on overnight.
11. If you have any concerns or questions immediately seek help from a graduate student or one of the professors. Graduate students are the primary individuals who take care of the pickle disposal and mixing. Graduate students are the individuals that first need to be contacted about the pickle that has been contaminated or is no longer working.

#### **U. Tumbler protocol**

1. When using the tumblers, the student is responsible for cleaning them after use.



2. If a tumbler pops open and spills shot and liquid, the student who is using it is responsible for cleaning it up.
3. A small amount of dish soap and warm water should be used with stainless steel shot when tumbling.
4. If you encounter any problems with a tumbler, stop use immediately and report the incident.

#### **V. Metal lathe**

1. Only students who have been trained to use this machine are permitted to do so.
2. The metal lathe is potentially dangerous piece of equipment if used improperly.
3. Eye protection is mandatory when using this equipment.
4. It is recommended that long hair be tied back and loose clothing and jewelry be secured when using this machine.
5. There is the potential for severe cuts when using this equipment.
6. It is essential that the student keep track of all small components using in operating the lathe. Keep all materials together.

#### **W. Vulcanizer**

1. Only students who have been trained to use this equipment are permitted to do so.
2. The vulcanizer is a potentially dangerous piece of equipment if used improperly.
3. This unit produces high heat and could cause serious burns if used improperly.
4. Rubber molds are cut using a surgical scalpel; extreme caution must be used while cutting molds. The vulcanizing equipment may not be left unattended and must be shut off at the end of its use.
5. After use, the area surrounding the vulcanizer must be thoroughly cleaned and all equipment put away. The student is responsible for waiting until the unit is cool in order to put it away.

#### **X. Wax injector**

1. Only students who have been trained to use this equipment are permitted to do so.
2. The wax injector is a potentially dangerous piece of equipment.
3. Eye protection is mandatory when using this piece of equipment because the contents are hot and under pressure, which could result in serious eye injury.
4. This unit produces high heat and could cause serious burns if used improperly.

## **Woodworking**

Woodworking hazards include the wood itself, preservatives that may be present within the wood, hand and machine tools used to shape it, glues and finishing compounds. Wood sculpture can use many different types of hard and soft woods, including many exotic tropical woods. Carefully review safety data sheets (SDS) for the wood and other products you use.

Activity	Hazards	Precautions
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Working with wood	Dusts from many hardwoods are sensitizers and both hard and softwoods can cause allergic reactions of the eyes, skin and respiratory system. Some woods (particularly hardwoods) may be toxic or treated with chemical preservatives. Dust produced during cutting and sanding operations can present inhalation hazards.	Review the SDS. Use tools and equipment that is equipped w/ a dust collection system. Wear gloves and a dust mask when working with treated or toxic wood. Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM Clean up wood dust and debris frequently.
Operating mechanical equipment	Improper use of equipment can cause serious injuries. Clothing, hair, fingers can get caught in moving equipment. Damaged electrical cords, plugs and switches can cause fires or electrical shock. Prolonged exposure to high noise levels can cause hearing loss. Extended use of vibrating hand tools can cause damage to the muscles and tendons in the hand.	Do not use equipment without prior training. Keep guards in place. Use push sticks. Remove jewelry (watch, rings, etc.), pull back long hair and roll up sleeves. Always unplug equipment and <b>turn it off</b> to clean or adjust it. Wear appropriate PPE (eye protection, hearing protection, etc.)
Using non-powered hand tools	Damaged or defective tools can cause injuries. Improper storage can damage the tool and/or cause injury.	Report damaged equipment to instructor. Store tools neatly. Protect sharp edges.
Working with hazardous materials (coatings, adhesives, solvents)	Some materials contain toxic chemicals that can be hazardous by inhalation or skin contact. Some materials are flammable.	Review the SDS. Apply hazardous materials in a well ventilated area (spray booth). Wear gloves to prevent skin contact with hazardous materials. Keep containers closed when not in use.  Dispose of solvent-soaked rags properly.

**Other important notes:**

- Do not use mechanical equipment until you have been trained by a faculty member.\*
- Substitute less hazardous materials whenever possible.
- Always select the machine that will do the operation the best, easiest and safest way.
- Take your time, and use every precaution possible.
- Use proper lifting techniques and get help when handling awkward or heavy materials.
- Take the time to clean all shared tools and spaces as you go and once you are finished working.

**\* Carefully follow instruction and procedures for the following:**

- |  |            |
|--|------------|
| Woodshop rules   | Jointer    |
| Abrasive finishing machines (belt sander, disc sander) | Lathe      |
| Angle grinder  | Miter saw  |
| Band saw   | Planer     |
| Drill press  | Radial saw |
| Panel saw  | Scroll saw |
|  | Table saw  |
- Drum sander

**Sculpture Department – woodshop guidelines**

**General guidelines**

- Check in with a monitor and give them your shop card to access all tools.
- Never wear headphones in the shop area.

- Avoid talking to or startling someone while they are operating a power tool.
- Cell phone use is only allowed in the shop in the case of an emergency.
- Never place drinks or water bottles on the tools.
- Keep oily or paint-soaked rags and other flammable materials out of the woodshop.
- Keep vices closed with the handle in the vertical position and keep locker doors closed.
- Use the dust collector every time you turn on a tool, except for the panel saw, drill press and router.
- Do not work or store materials on the table saw outfeed table.

#### **Cutting and material guidance**

- Do not stand in the rotational path of any machine.
- Never reach across a piece of operating machinery and always maintain proper footing.
- 2x4s must be joined and planed before being cut on the table saws.
- Rough sawn lumber must be joined and planed before it can be cut using the table saws or chop saw.
- Only straight dimensional lumber may be cut using the power tools.
- Round stock should be cut by hand or on the band saw with the proper jig.
- Never sand foam or fiberglass in the shops or studios.
- Do not cut or sand pressure treated wood.
- Consult the shop technician before using reclaimed lumber on any of the power tools.

### **Department of Craft/Material Studies – wood area**

#### **General safety**

The wood studios, materials, and equipment are only permitted for use to students enrolled in wood area course credits, senior critique course credits with a focus in wood, craft majors who have taken class in the area before, or those granted permission by the wood area lead faculty. These are rooms 213, 214, and 215.

1. All persons must wear safety glasses upon entering the wood shop. Please note that a face shield is not a substitute for safety glasses; it is only added protection.
2. Working with wood is dusty. It is recommended that you provide your own particle mask. If you have dust allergies or asthma, please consider using a high-end particle mask or an appropriate respirator.
3. Hearing protection is recommended.
4. Appropriate attire must be worn to work in the wood shop. No long jewelry or baggy clothes may be worn when working with power tools. Long hair must be tied back. No open-toed shoes. Never wear gloves.
5. No headphones are to be used when working in the machine shop.
6. No smartphone/cell phone use in the machine shop.
7. No student is allowed to work with power tools while alone in the shop.
8. Never work with hand tools, power tools or machinery if overly tired.
9. Never turn on any machine or power tool with your work piece contacting any blade, bit or abrasive surface.

In other words, the machine or power tool must be started and running before it comes in contact with a work piece.

10. No one is permitted to remove a safety guard from any tool.
11. No maintenance adjustments are to be made to any equipment except by wood area faculty or the studio manager. No exceptions.
12. Never speak to anyone using a power tool. Wait until they are done.
13. If you find any tool in need of repair, turn it off immediately and tell the shop monitor. Under no circumstances should you make repairs to the equipment yourself. Please note that broken tools may take up to two weeks to get back online.
14. Shop users are responsible for immediately cleaning up their work area and the tools when done. This must be done before another person uses the area. Brooms, hand brooms, a Shop- Vac, dustpans and an air hose are provided. Failure to clean up can result in suspension from the shop.
15. Wood and supplies must be stored in allocated shop areas. Projects in process may not be left in the machine room.
16. Only new lumber may be used in the shop. All bark must be removed from wood and wood must be properly dried. Any recycled or found materials must be thoroughly inspected before being machined.
17. Nothing wet is to be placed on any of the tools. No soda cans, towels, food, etc.
18. No other material, like metal or plaster, is to be used in the wood shop without permission.

19. No open flames in the wood shop.
20. Immediately report any and all accidents or incidents to the shop monitor, no matter how small.
21. If you notice that a specialty tool—usually a small and portable one—is missing from shop inventory talk to the shop monitor or faculty member and arrangements may be made to order the tool.
22. Dust collection ventilation must be turned on before using equipment in the machine shop.
23. Pressure-treated lumber is not permitted in the shops.

## **Tools and machinery**

### **Miter saw**

1. Maintain a 6-inch margin of safety from the blade. This means that you must keep your hands 6 inches away from the path of the saw blade.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Keep the blade guard in position at all times.
4. Hold stock firmly on the table and against the fence.
5. After making the cut, but before raising the saw, make sure that the blade has come to a complete stop.
6. When making multiple cuts of various angles do not move hands under the blade, whether it is moving or not.
7. When you complete your work at the saw, lower the saw and lock it in place. Sweep the workstation and the floor. All scrap goes into the scrap bin.

### **Radial arm saw**

1. Turn on the dust collection before using the radial arm saw.
2. Make sure there are no scrap pieces or chips on the floor in front of the radial arm saw.
3. Make sure there are no scrap pieces or chips lodged between the fence and the blade.
4. Make sure there are no scrap pieces or chips lodged between the blade guards and the blade.
5. Do not make any adjustments to the radial arm saw.
6. With the saw off, pull the saw out to ensure that the blade clears the stock to be cut, then push it all the way back.
7. Mark the waste side of your stock to be cut.
8. Never turn the radial arm saw on while the saw blade is touching your stock.
9. Stand to the left side of the blade. Turn the radial arm saw on and wait until it has reached full speed before starting to cut your stock.
10. Hold the stock with your left hand and pull the saw with your right hand. Ensure that stock is pressed firmly against the fence. If the stock has a crook in it, the concave side of the crook is to be away from the fence. Maintain a 6-inch margin of safety around the blade and the blade path.
11. Cut only one piece of stock at a time.
12. The blade has a tendency to pull itself through the stock. This is known as “crawling.” You **must** anticipate and counteract this tendency. Use the “stiff arm” technique so that the saw will cut through the stock at a steady, even pace.
13. Feed the saw into the stock only as fast as it will go with ease. Maintain a firm grip on the saw handle and use the “stiff arm” technique to maintain control as the cut is being made.
14. While cutting, from the back towards yourself, pull the saw straight out.
15. **Concentrate, concentrate, concentrate.** Do not let yourself become distracted at any time while operating the radial arm saw. Keep your full attention on the blade, stock, fence, and where your hands are while cutting.
16. **Never** reach anywhere towards or around the blade to remove scrap pieces or chips while the blade is in motion. **Maintain the 6-inch margin of safety.**
17. Always turn the radial arm saw off and wait until it stops moving before making any adjustments that you are permitted to make.
18. **Never** leave the saw while it is running.
19. When finished working with the radial arm saw, push the saw all the way back to the rear of the table and then turn the machine off. Remain in the work zone until it stops moving.
20. **After** the blade stops moving, remove scraps/chips from the table, around the blade, and off the floor so that the next user is ready to begin.
21. On occasion, it is acceptable to hold stock with the right hand and pull the saw with the left hand. However, under **no circumstances** should your arms be crossed across the blade path.
22. While there are a variety of operations that the radial arm saw is capable of performing, we are going to restrict its use to rough cross-cutting to length.

### Table saw

1. Open the ventilation gate and turn on the dust collection before using the table saw.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. The saw is equipped with a blade guard. The device is the most important safety feature for this piece of equipment and may not be removed or circumvented. If there is a cut to be made on the table saw that must circumvent the guard the shop monitor must perform the cut.
4. Be certain that the blade is sharp and that it is the right blade for your work. The shop has a dedicated blade for cutting Plexiglas.
5. Set the blade so that it extends no more than 1/4-inch above the stock to be cut.
6. Stand to one side of the operation blade. Do not reach across it.
7. Make sure that the stock is fully past the blade before turning the saw off.
8. A variety of push sticks are provided and must be used when cutting material under 3 inches.
9. Rough stock must be surfaced jointed, and have at least one side jointed, before being cut on the table saw.
10. **Never cut stock free hand.**
11. Use only new stock that is free of knots, splits and warp.
12. Do not let small scrap cuttings accumulate around the saw blade. Use a push stick to push them away.
13. Students helping to support large stock from the saw should not push or pull the stock. They should support the stock only as necessary. The operator must control the feed and direction of the cut.
14. Cross-cutting on the table saw, when done incorrectly, is dangerous. Cross-cuts 12 inches or less can be made on the cross-cut sleds or the DeWalt sliding compound miter saw.
15. Cut down full sheets of plywood on the panel saw.
16. As you complete your work, turn off the saw and remain until the blade has stopped.
17. Clear the saw of dust and waste. Return the saw blade to zero settings. **Sweep the work area.**

### Vertical panel saw

1. Cut down full sheets of plywood on the panel saw. Do not use the table saw for full sheets.
2. Safety glasses required. Particle mask and hearing protection recommended.
3. When cross cutting stock, let the saw blade come to a full stop before raising it up for the next cut. When cross-cutting, cut from the top only.
4. Do not drop plywood on guide wheels; this might throw them out of alignment.
5. Support large sheets of plywood properly.
6. When ripping on the panel saw, you will need help from the shop monitor to “catch” the cut material. The monitor will finish the cut by pulling both the stock and the off cut through the saw.
7. Clean tool and work area when done.

### Band saw

1. Open the ventilation gate and turn on the dust collection before using the bandsaw.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Wheel guard doors must be closed and the blade properly adjusted before turning on the machine.
4. Adjust the upper guide assembly so it is no more than 1/4 inch above the work.
5. Allow the saw to reach full speed before starting to feed the work.
6. The stock must be held flat on the table.
7. Feed the saw only as fast as the teeth will remove the wood easily.
8. **Maintain at least a 4-inch margin of safety.** This means that one’s hands should always be at least 4 inches away from the blade when the saw is running.
9. Plan cuts to avoid backing out of curves, whenever possible. If backing out of a cut is unavoidable, turn off the machine and wait for the blade to stop before backing out. Always use a scrap piece of wood to push against the blade when backing out of a cut to avoid pulling the blade off of the upper wheel.
10. Make turns carefully and do not cut radii so small that the blade is twisted. This can result in the blade breaking.
11. Round stock should not be cut unless mounted firmly in a jig.
12. Do not let small pieces of wood accumulate around the blade. Move them out of the way with a push stick or turn off the saw, wait until the blade stops, and then clear the table. Never clear small pieces of material by hand with the machine running.
13. If you hear a clicking noise, turn off the machine at once. This sound indicates a crack in the blade. If the

blade breaks, shut off the power and move away from the machine until both wheels stop.

14. Turn off the machine as soon as you finish working. Sweep the table and the floor and put all scrap in the scrap bin. Lower the upper guide assembly.

#### Scroll saw

1. Safety glasses are required. Particle mask and hearing protection recommended.
2. Thread blade through hole in material, when applicable, and secure before turning the scroll saw on.
3. The stock must be held flat on the table.
4. Feed the saw only as fast as the teeth will remove the wood easily.
5. **Maintain at least a 4-inch margin of safety.** This means that one's hands should always be at least 4 inches away from the blade when the saw is running.
6. Make turns carefully and do not cut too quickly. This can result in the blade breaking.
7. Flat stock only. No material thicker than 1/4" inch.
8. Never clear small pieces of material with the machine running.
9. If the blade breaks, shut off the power before replacing blade.
10. Clean the tool and the work area when done.

#### Drill press

1. Secure work properly.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Never stand on tool.
4. Do not wear gloves or loose clothing.
5. Never start the drill press with the drill bit or cutting tool in contact with the workpiece.
6. Do not attempt to drill material that does not have a flat surface. No round stock.
7. Stop the drill press before removing scrap pieces from the worktable.
8. Clean the tool and the work area when done.

#### Edge sander

1. Open the ventilation gate and turn on the dust collection before using the edge sander.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Edge sander is for long grain sanding only and stock must be a minimum of 12 inches.
4. Never turn on machine with the stock touching the belt.
5. Do not use worn out or "loaded up" sanding belts. There is a rubber sanding belt cleaner stick, next to the sander, to help clean loaded up sanding surfaces. Use of the cleaner will make the sanding surfaces last longer.
6. Always hold work securely with both hands.
7. Ease stock slowly into contact with the belt, starting with the right end of stock slightly before making full contact. Do the opposite when removing the stock.
8. Set table at a slight angle with right side up. This engages a larger area of the belt, helping increase the life of the abrasive surface.
9. Report any tears, holes or flaws to the shop monitor. Do not attempt to re-adjust the machine yourself.
10. Clean up when done.

#### Disc sander

1. Open the ventilation gate and turn on the dust collection before using the disc sander.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Never turn on machine with the stock touching the disc.
4. Do not use worn out or "loaded up" sanding discs. There is a rubber sanding disc cleaner stick, next to the sander, to help clean loaded up sanding surfaces. Use of the cleaner will make the sanding surfaces last longer.
5. Always hold work securely with both hands.
6. The disc sander has the ability to spin clockwise and counter-clockwise. **Always use the half of the disc that is spinning down towards the table.**
7. Always keep your workpiece in contact with the disc sander bed.
8. Always use the auxiliary bed when using the disc sander in the 90-degree (square) position. The auxiliary bed decreases the gap between the bed and the disc.
9. Only remove the auxiliary bed if you need to angle the bed.
10. Report any tears, holes or flaws to the shop monitor. Do not attempt to replace sanding disc yourself.

11. Clean up when done.

#### Spindle sander

1. Open the ventilation gate and turn on the dust collection before using the spindle sander.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Never turn on machine with the stock touching the spindle.
4. Never attempt to place over the spindle, or remove, a workpiece with a hole in it, while the machine is running.
5. Do not use worn out or “loaded up” sanding sleeves. There is a rubber sanding sleeve cleaner stick, next to the sander, to use on loaded up sanding surfaces. Use of the cleaner will make the sanding surfaces last longer.
6. Always hold work securely with both hands.
7. Always push material against the rotation of the spindle.
8. Report any tears, holes or flaws in the spindle sleeves to the shop monitor. Do not attempt to re-adjust the machine yourself.
9. Clean up when done.

#### Router table

1. Open the ventilation gate and turn on the dust collection before using the router table.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Unplug router at the safety power switch before changing out or raising or lowering the bit, or before setting the fence.
4. Never turn on machine with the stock touching the router bit.
5. Always push stock against the rotation of the router bit.
6. Avoid climb-cutting (or cutting with the rotation of the router bit).
7. Always use the push blocks when feeding stock through the router.
8. Never cut more than 1/8 inch at a time with any of the router bits.
9. Turn router off when finished. Unplug at the safety power switch and take out and put away the bit.
10. Clean up when done.

#### Jointer

1. Open the ventilation gate and turn on the dust collection before using the jointer.
2. Be sure that you have the shop coordinator’s approval to operate this machine. If you need assistance ask a the shop monitor for help or an additional demonstration.
3. Safety glasses are required. Particle mask and hearing protection recommended.
4. Before turning on the machine, make adjustments for depth of cut and position of fence.
5. Do not remove the guard. Do not adjust the outfeed table.
6. Maximum cut depth for jointing is 1/16 inch.
7. Stock must be at least 12 inches long.
8. Feed the work so that the knives will cut with the grain. Use only new stock that is free of knots, splits and checks.
9. Keep your hands away from the cutter head, even though the guard is in position. **Maintain at least a 6-inch margin of safety.** This means that one’s hands should always be at least 6 inches from the cutter head.
10. Use a push block when jointing a flat surface. Never apply pressure directly over the cutter head with your hand.
11. Do not joint end grain.
12. The jointer knives must be sharp. Dull knives will vibrate the stock and may cause a kickback.
13. Material cannot be less than 3/8 inch thick.
14. Clean tool and work area when done.

#### Thickness planer

1. Open the ventilation gate and turn on the dust collection before using the planer.
2. Safety glasses are required. Particle mask and hearing protection recommended.
3. Inspect all wood before using the thickness planer. Recycled material should be carefully inspected for nails, screws, staples or any other inclusions that may damage blades or equipment.
4. Check planer table before turning it on.

5. Make all adjustments with the power off.
6. Maximum cut depth for planer is 1/8 inch.
7. Be aware that some woods are harder than others; harder woods will need more passes through the planer. Do not plane the maximum depth of cut when planing harder wood. Two passes through the planer can be better than one.
8. Keep hands and fingers away from cutter head when machine is running.
9. Never reach inside of the machine, from the front or back, between the cast-iron bed and the hood of the machine.
10. When planing thin pieces of wood, be sure to stand to one side in case the wood breaks and kicks back.
11. Support the work properly at the in-feed bed and at the out-feed bed.
12. Clean tool and work area when done

### Thickness sander

1. Examine the workpiece to make sure it is suitable for sanding.
2. Open the ventilation gate, turn on the dust collection, turn on the pneumatic air, and tension the sanding belt before using the thickness sander.
3. Safety glasses required. Particle mask and hearing protection recommended.
4. Maximum depth of sanding cut is 5/1,000-inch at a time. In other words, you can only raise the conveyor height by 5/1,000 inch for each pass.
5. Measure thickness of material and set the conveyor bed to sand off the appropriate amount.
6. Turn on the main power supply, then the sanding and conveyor motors.
7. Slowly feeds the workpiece onto the conveyor belt, then release the workpiece when it is feeding through the sander.
8. Stand to the side of the machine and removes the workpiece from the sander as it exits from the rear.
9. If the sander automatically shuts off in the middle of a pass please tell the shop monitor.
10. Turn the sanding and conveyor motors off when finished.
11. De-tension the sanding belt when finished.
12. Turn off the pneumatic air when finished.
13. Clean up any saw dust in area.

### Lathe

1. Before starting the machine, be sure that spindle work has the cup center properly embedded, tail stock and tool rest are securely clamped and there is proper clearance for the rotating stock.
2. Before starting the machine for faceplate work, disengage the spindle lock and check to see that the faceplate is tight against the spindle shoulder and the tool support has proper clearance.
3. Safety glasses and a face shield are required. Particle mask and hearing protection recommended.
4. Select turning speed carefully. Large diameters must be turned at the lowest speed. Always use the lowest speed to rough out work.
5. Wood with knots and splits should not be turned. Glued up stock should cure at least 24 hours.
6. Keep the tool rest close to the work and at the appropriate height.
7. Always remove the tool rest for sanding and polishing operations.
8. Use a scraping cut for all face plate work.
9. Remove both the spur and cup centers when they are not in use.
10. When you stop the lathe to check your work also check and lubricate the cup center.
11. Keep the lathe tools sharp; hold them firmly and in the proper position.
12. No loose clothing
13. Keep your sleeves rolled up.
14. Clean up debris and dust.

### Hand tools

1. Safety glasses required.
2. When using the carving chisels, **do not force them**. Do not hog out too much wood and approach knots with caution. Take care of the mallet when striking the chisels. **Do not drop the chisels**.
3. Secure stock when working. If you don't know how, **ask**.
4. Put them back in their proper place.
5. When cutting with a knife or razor, cut away from yourself.



6. If the tool is broken or compromised please tell the shop monitor.

#### Brad nailer

1. Add a drop of tool oil into air supply connector before connecting air supply hose.
2. Safety glasses are required. Particle mask and hearing protection are recommended.
3. Disconnect tool from air hose before clearing a jammed fastener.
4. Connect tool to air supply before loading fasteners. Always assume that the tool contains fasteners.
5. Never point the tool at yourself or anyone else.
6. Remove finger from trigger when not driving fasteners. Never carry a tool with your finger on the trigger.
7. Do not drive fasteners into a surface that is too hard.
8. Do not drive fasteners on top of other fasteners or drive fasteners at too steep of an angle.
9. Keep hands and fingers away from the nailing area. You could nail through the material and into your finger.
10. Do not fasten too close to the edge of the material. The material could split and the fastener could fly free or ricochet, causing personal injury to you or someone in the work area.
11. When finished, blow off the tool and return to the tool case. Roll up air hose.

#### Random orbital sanders

1. Safety glasses are required. Particle mask and hearing protection are recommended.
2. Never exceed marked maximum input pressure (90 psi/.62 Mpa/6.2 Bars).
3. Use care in attaching back-up pad. Follow the instructions to ensure that it is securely attached to the tool before use.
4. Never free spin the tool or otherwise allow it to be started unintentionally.
5. Never point this product in the direction of yourself or another person.
6. Secure wood to workbench before sanding.

#### Angle grinder

1. Safety glasses are required. Face shield is recommended. Face shields are not a substitute for safety glasses.
2. Particle mask and hearing protection recommended.
3. Do not grind metal in the wood shop.
4. Never remove the guard. It can be rotated for optimum positioning.
5. Always use the auxiliary handle for maximum control over torque reaction and kickback.
6. Always secure the work properly on the workbench. Adjust your work to a comfortable height. There is a portable step to stand on if you need to be higher. **If you don't know how to secure your work, ask.**
7. Adjust the position of the piece for easy access and to avoid grinding the workbench.
8. When carving with the carving attachment for the angle grinder, be very careful.
9. Grip the tool with both hands at all times.
10. No loose clothing.
11. Be very aware of people around you. Ask them to give you space if you need it.
12. When finished, blow off the tool, put it away and sweep the work area.

#### Circular saw

1. Safety glasses are required. Particle mask and hearing protection are recommended.
2. Cut down full sheets of plywood on the panel saw.
3. Check to see that blade guard is working properly.
4. Set blade depth 1/4 inch below the material thickness you are cutting.
5. Always hold the saw with two hands.
6. Arrange the material so that the saw will not bind as you are cutting the material.
7. Unplug cord before changing the blade or working on the tool.
8. Clean tool and work area when done.

#### Jig saw

1. Safety glasses are required. Particle mask and hearing protection are recommended.
2. Unplug cord before changing the blade.
3. Make sure blade is installed correctly.
4. Always secure the work properly on the workbench. Adjust material if needed to avoid cutting into the workbench.
5. Hold jigsaw securely when using.

6. Clean tool and work area when done.

### Drills

1. Safety glasses are required. Particle mask and hearing protection are recommended.
2. Make sure drill or driver bits are installed correctly.
3. Never hold behind where you are drilling in case the bit comes through the material and out the back.
4. Hold drill securely when using.
5. Avoid drilling through material and into workbench.
6. Clean tool and work area when done.

### Handheld routers

1. Safety glasses are required. Particle mask and hearing protection are recommended.
2. Unplug router before changing out, raising or lowering the bit.
3. Always secure the work properly on the workbench before using any handheld router.
4. Never turn on the router with the stock touching the router bit.
5. Always hold the routers with two hands when appropriate.
6. Always cut against the rotation of the router bit.
7. Avoid climb-cutting, or cutting with the rotation of the router bit.
8. Always use a bearing bit, a template, or a straight edge fence when using the router.
9. Never cut more than 1/8 inch at a time with any of the router bits.
10. Turn router off when finished. Unplug router, then take out the bit and put away.
11. Clean up when finished.

### Information for wood allergies and toxicity

- <http://www.wood-database.com/wood-articles/wood-allergies-and-toxicity/#chart>

### **OSHA: Guide for Protecting Workers from Woodworking Hazards**

- [https://www.osha.gov/Publications/woodworking\\_hazards/osha3157.html](https://www.osha.gov/Publications/woodworking_hazards/osha3157.html)

## **Fiber**

Hazards associated with the fiber studio are related dyeing fiber: preparation of dyes for application on fabrics. Carefully review safety data sheets (SDS) for the products you use when dyeing fabrics.

<b>Activity</b>	<b>Hazards</b>	<b>Precautions</b>
Working with clay	Handling and mixing dyes in powder form can cause an inhalation hazard.	Review the SDS. Avoid creating dust. Any use of a NIOSH-approved N95 dust mask/respirator must be approved by EHS-SRM

## **Department of Craft/Material Studies – Fiber Area**

### **General safety**

1. The fiber studios, materials and equipment are only permitted for use by students enrolled in fiber area course credits, senior critique course credits with a focus in fiber, craft majors who have taken class in the area before, or those granted permission by the fiber area lead faculty. These are rooms 210, 211, 211B, 212, 212A, 212B, 212C.
2. It is best treat the use of chemicals and dyes in the area with caution:
  - Wear rubber gloves to minimize contact with skin.
  - Never use dye utensils for food preparation.
  - While working with sodium bisulfate it is important to wear a dust mask, rubber gloves, safety goggles, and an apron or old clothes.
3. Keep your work area clean.
4. The washer and dryer are only to be used for cleaning print fabrics, drop cloths and other fabrics used in class.

They cannot be used for personal laundry.

**Gas stock pot range**

1. You must be trained by faculty in order to use the gas stock pot range.
2. The gas range should be off except when it is in use.
3. Keep all flammable items away from the stove.
4. Pilot must be lit before opening gas for burner rings.
5. After use, make sure all burner rings have been turned to the off position and the ball valve for the corresponding burner is turned off (perpendicular to the pipe).
6. Take special care not to spill hot water when transferring the stock pot to the sink.

<https://www.cpsc.gov/s3fs-public/5015.pdf>

## Theatre Addendum:

### Policies

- I. Faculty or staff onsite: No work is to be performed for a Theatre VCU production without a faculty or staff member onsite. This includes but is not limited to:
  - A. Operating lifts or using ladders
  - B. Working in the grid or catwalks or at any height above the stage or house floor of Hodges Theatre.
  - C. Operating any power tools, including handheld or battery-operated power tools and soldering equipment.
  - D. Handling potentially dangerous chemicals or compounds including (but not limited to) aerosol paints, oil-based paints and compounds, adhesives and solvents.
- II. Fall Protection- The best means of fall protection is never to be in a position you can fall from in the first place. Always consult with the TD or Shop Foreman before beginning to work at height so that we may determine the best way to mitigate fall potential.
  - A. Barrier walls must be erected on the vom platforms before sound or other equipment may be installed.
  - B. All work in the grid and catwalks must be done behind the existing railings.
- III. Solvents and aerosols: Aerosols, solvents, and oil-based paints should be used outside the building.
- IV. Head Protection: All students, faculty, staff, and visitors are required to wear hardhats in Hodges Theatre when any work is being done in the catwalks or grid. Hardhats must be worn by anyone working beneath a lift or ladder. It is the responsibility of the supervisor to alert the onstage crew if there is work being done in the catwalks or grid.
- V. Students working in production areas should wear clothing appropriate for their work.
  - A. Open toed shoes may not be worn for any work. Students, faculty, staff, and visitors may not enter the scene shop without proper footwear.
  - B. No loose or dangling clothing, jewelry, wallet chains, etc. If it gets caught in a tool, it can cause an injury.
  - C. Long hair must be tied back.
- VI. Weapons Policy:
  - A. All students involved in the use of prop weapons must be trained by the Associate Chair in proper use, maintenance, and storage of prop weapons.
  - B. At no time is a prop firearm to be left unattended. When not onstage, prop firearms must be kept in a lockable box and monitored by Stage Management. Prop firearms must not be placed on props tables. Please read the Simulated Firearms Policy (Link posted on scene shop door) before even considering the use of one in a production or bringing one to campus.
  - C. Prop Knives and Swords must be blunted and dulled and approved by the Associate Chair prior to use.
- VII. Special Effects:
  - A. Pyrotechnics and live flame are not permitted in any performance or rehearsal space.
  - B. Changes in Elevation, including Pits or Traps must be clearly marked with glow tape and barricaded when not in use.
  - C. When using fog or haze in a production, front of house staff must be notified so that they can include a disclaimer in the program and place notices indicating that atmospheric effects will be used in the production.
  - D. In order to avoid triggering fire alarms, the level of fog and haze on a production may be arbitrated by the Department Chair or Faculty Technical Director.
  - E. When fog and haze is used on a production, all cast and crew should be informed to alert the Stage Manager if there is a concentration of fog in other areas of the building.
  - F. If strobe lighting is to be used in a production, front of house staff must be notified by Stage Management so they can include a program disclaimer and post notices that strobe lighting will be used.
  - G. Aerial Performance consisting of the suspension of performers above the stage must be undertaken with the close supervision and approval of an experienced professional technical engineer and the Faculty Technical Director.

## VIII. Rigging:

- A. Before implementation of any rigging project, proof of concept must be demonstrated to the Faculty Technical Director or the Scene Shop Foreman. All rigging supplies are to be inspected by qualified personnel prior to their use in the implementation of any rigging project.
- B. Each component of a theatrical rigging system needs to be capable of supporting the load it is designed to accommodate.
- C. Every light, speaker, or any other piece of equipment above the surface of the stage or house floor MUST have a safety cable securely attached both to the equipment and the position from which the equipment is hung.
- D. Before hauling any piece of equipment up or down on a handline, ensure that every component of the equipment is secure and cannot come loose in the air. If you cannot tie a knot correctly, ask your instructor for help.
- E. Make sure that any rope or cord used to haul equipment up or down is both strong enough to handle the load and not frayed or damaged in any way. Never use electrical cabling to haul equipment up or down.
- F. Before entering the grid or catwalks be sure to empty all pockets. All tools should be secured to the worker.
- G. When working onstage, if any overhead work is taking place, wear a hard hat.
- H. Never drop any unsecured object from a height.
- I. Do not use rigging equipment whose load rating is unknown. If you are unsure of the load rating of a piece of rigging equipment, see the Technical Director or Lighting and Sound Shop Supervisor.
- J. Before moving any rigged object (i.e. motor-driven truss, flying batten), warn all individuals who may be affected by the move, whether on the stage, front of house, or in the grid.
- K. Maintain visual contact on any moving rigged object at all times. Be aware of anyone potentially moving into harm's way, and warn them away from the hazards inherent in a mobile rigged object (i.e. "Get back!")

## **TheatreVCU Scene Shop Safety Rules**

### **General Shop Safety Rules**

- Wear eye protection
- Wear ear protection as necessary for loud operations
- Wear dust masks for dusty operations
- Do not wear loose clothing
- Put up long hair
- Wear proper footwear
- Keep distractions at a minimum
- Keep work area clean-clean up waste when done
- Do not wear jewelry, rings
- NO HORSEPLAY!

### **General Power Tool Safety**

- Use the right tool for the right job
- Do not alter or modify a tool or disable any safety feature
- Never leave running tool unattended
- Allow power tools to come to full speed before engaging work
- Allow tools to come to a complete stop before continuing
- Do not force tools
- Unplug saws before changing blades and keep plug in sight
- Remove adjusting keys/wrenches before starting tools
- Report any problems with a tool
- When using hand power tools, support work on stable surface
- Do not overreach-keep good footing. Avoid awkward operations and hand positions
- Get help with large pieces- properly support long or wide work

- Ensure guards are in place before starting tool
- Keep hands out of line with saw blades

#### **Table Saw**

- Do not operate without guard in place
- Blade should be no more than 1/2" above work, but ensure that it is high enough to cut through the tallest part of the sheet if the sheet is warped.
- Allow blade to come to complete stop before removing work/waste
- Do not reach underneath work or around or over the blade while blade is rotating
- Do not attempt to remove cut material when blade is moving
- NEVER FREEHAND WORK! Work must always be against a fence or miter gauge
- Use push stick-never get hands closer than 6" from the blade
- Keep hands from path of blade
- Do not walk behind the table saw while it is in use.

#### **Band Saw**

- Adjust the upper guide about 1/8 above the material being cut
- Stop the machine before removing scrap pieces from the table
- Keep hands and fingers away from the blade.
- Hold material firmly and flat on the table and feed into blade at a moderate speed
- Turn off machine if the material is to be backed out of an uncompleted cut
- Make "release" cuts before cutting long curve

#### **Miter Saw**

- Keep hands out of the path of the saw blade. NEVER CUT A PIECE WHERE HAND WOULD BE 6" OR LESS FROM BLADE
- Do not perform any operation freehand
- Never reach in back of saw blade
- Return carriage to the full rear position after each crosscut operation
- Don't move either hand from saw or workpiece or raise arm until blade has stopped
- Clear area of waste/debris before cutting and after

#### **Vertical panel saw**

- Cut down full sheets of plywood on the panel saw. Do not use the table saw for full sheets.
- Safety glasses required. Particle mask and hearing protection recommended.
- When cross cutting stock, let the saw blade come to a full stop before raising it up for the next cut. When cross-cutting, cut from the top only.
- Do not drop plywood on guide wheels; this might throw them out of alignment.
- Support large sheets of plywood properly.
- Clean tool and work area when done. Stationary sander
- Never turn the machine on before clearing the table/work area of all objects (tools, scraps of wood, etc.). Flying debris is dangerous.
- Never turn the machine on with the workpiece contacting the abrasive surface
- Support the workpiece firmly on the work table when sanding with a belt. Hold the workpiece firmly.
- Feed the workpiece against the downward rotation side of the disc
- Do not sand very small or very thin workpieces that cannot be safely controlled
- Never perform layout/assembly work on the table/work area when the machine is running. A sudden slip could cause a hand to move into the abrasive surface. Severe injury can result.

#### **Drill Press**

- Never turn the machine before clearing the table of all objects (tools, scrap pieces, etc.). Debris can be thrown at high speed.
- Properly lock the bit in the chuck
- Tighten all lock handles before starting the machine
- Keep arm, hands, fingers away from the bit
- Clamp the work securely to the table.

- Never perform layout/assembly work on the table/work area when the machine is running

#### **Abrasive Cut off saw**

- Wear hearing protection
- Secure work in clamp
- Hold the handle firmly
- Keep hands away from rotating parts

#### **Port-A-Band**

- Keep shoe against work
- Secure clamp work in vise or otherwise secure from movement
- Use both hands

#### **Bench grinder**

- Do not wear gloves
- Wear ear protectors (plugs or muffs) during extended periods of operation
- Do not grind aluminum, wood, or plastic

#### **Circular saw**

- Keep hands away from the cutting area and blade. Whenever possible, keep your second hand on the auxiliary handle, or motor housing. If both hands are holding the saw, they cannot be cut by the blade. Hold the saw firmly to prevent loss of control.
- Keep your body positioned to either side of the saw blade, but not in line with the saw blade. KICKBACK could cause the saw to jump backwards
- Do not reach underneath the work. The guard cannot protect you from the blade below the work
- Check the lower guard for proper closing before each use. Do not operate saw if the lower guard does not move freely and close instantly.
- Never clamp or tie the lower guard into the open position.
- NEVER hold a piece being cut in your hands or across your leg. It is important to support the work properly to minimize body exposure, blade binding, or loss of control.
- Never attempt to remove the saw from the work or pull the saw backward while the blade is in motion or KICKBACK may occur.
- Adjust depth of blade to not more than 1/2" deeper than work
- Make only straight cuts

#### **JigSaw**

- Never leave the trigger locked "ON". Before plugging the tool in, check that the trigger lock is "OFF".
- Keep hands away from the cutting area. Do not reach under the material being cut.
- Keep hands from between the gear housing and saw blade holder. The reciprocating blade holder can pinch your fingers.
- Do not use dull or damaged blades. Bent blade can break easily or cause kickback.
- Secure material before cutting. Never hold it in your hand or across legs.
- Make certain all adjusting screws and the blade holder are tight before making a cut.
- BLADES GET HOT! When removing the blade avoid contact with skin and use gloves

#### **Sawzall**

- Never leave the trigger locked "ON". Before plugging the tool in, check that the trigger lock is "OFF".
- Keep hands away from the cutting area. Do not reach under or behind the material being cut
- Be aware of what/who is behind your work
- Keep hands from between the gear housing and saw blade holder. The reciprocating blade holder can pinch your fingers.
- Do not use dull or damaged blades. Bent blade can break easily or cause kickback.
- Secure material before cutting. Never hold it in your hand or across legs.
- Make certain all adjusting screws and the blade holder are tight before making a cut.
- BLADES GET HOT! When removing the blade avoid contact with skin and use gloves

#### **Drill**

- The body of the drill will spin with great torque if the bit becomes bound in the work. Position yourself to avoid

injury in this case. If the bit becomes bound in the workpiece, release the trigger immediately, reverse the direction of rotation and slowly squeeze the trigger to back out the bit.

- Bits get hot! Avoid contact with the bit after use.
- Check to see that chuck keys are removed from the drill before switching the tool "ON".

### **Router**

- Always make sure the work surface is free from nails and other foreign objects.
- Never place hands near or below cutting surface
- Secure the work and operate router with both hands
- After changing the bits or making any adjustments, make sure the collet nut and any other adjustment devices are securely tightened
- Always hold the tool with two hands during start-up. The reaction torque of the motor can cause the tool to twist.
- Never use dull or damaged bits. Sharp bits must be handled with care. Damaged bits can snap during use. Dull bits require more force to push the tool, possibly causing the bit to break
- Never touch the bit during or immediately after the use. After use the bit is too hot to be touched by bare hands.
- Never lay the tool down until the motor has come to a complete standstill. The spinning bit can grab the surface and pull the tool out of your control

### **Air Tools**

- Never point an air nailer/stapler at yourself or another person.
- Never blow compressed air at another person.
- Keep hands/fingers away from the nose of the tool at all times. No body part should be within a distance 3x the length of the fastener being used from the nose of the tool.
- Disconnect air before reloading nails/staples.
- Check air pressure before connecting the tool.
- Always assume tool is loaded

### **Soldering**

- As many solders contain lead, wear hand PPE such as nitrile or latex gloves while handling lead-based solder products.
- Wear eye PPE — safety glasses or goggles — when soldering. Soldering irons are very hot, and if hot solder contacts your eyes serious damage may occur.
- Never leave a hot soldering iron unattended.
- Always keep a clean workspace when soldering — ensure that arm or body movement will not move flammable or sensitive materials into harm's way while operating a soldering iron.
- Avoid soldering in poorly-ventilated areas. Ventilate your work area as best you can to avoid eye or throat irritation from fumes.
- Always store your soldering iron in its stand. NEVER store your soldering iron on a work table or other surface.
- Never touch a hot soldering iron.
- Never use a soldering iron for any purpose other than soldering.
- Never leave flammable materials near your soldering iron.
- Unplug your soldering iron and allow it to cool before leaving the work area.



## Appendix 2

# How to Read A Safety Data Sheet (SDS)

Safety Data Sheets (SDS) are an important requirement of the OSHA Hazard Communication Standard. SDS are essential documents that are used to inform employees, students, and the general public about how materials can be safely handled, used, and stored. Since Flinn provides chemicals only to schools, we have written Flinn SDS specifically for teachers and their students. Using clear and straightforward language, each Flinn SDS provides all the relevant safety and hazard information in a consistent, useful, and easy-to-read two-page format. Flinn SDS follow the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). The 16 sections are divided into four major areas, each designed to answer a specific question.

**What is the material and what do I need to know immediately in an emergency?**





**Sections 1–3.**

- A** It is important that the chemical name on the label match the name on the SDS. Many chemicals have similar names, but very different properties.
- B** The most important section! Provides an overview of the physical and health hazard risks associated with using the material.
- C** Signal words, either Danger or Warning, heighten the awareness of the relative risk when using certain chemicals. Danger is the more severe warning!
- D** Eight pictograms exist in the GHS classification scheme to call attention to physical and health hazards. See page 1238 for more information about GHS pictograms.
- E** This section includes the formula, formula weight, concentration, and CAS#. The CAS# is the single identifying number for each specific substance. CAS# should match the CAS# on the bottle label.

**What should I do if a hazardous situation occurs?**

**Sections 4–6.**

- F** Seek medical attention. These first-aid measures are only meant for immediate first aid and should always be followed up with professional medical care. The CAS# is the single identifying number for each specific substance. CAS# should match the CAS# on the bottle label.
- G** This section is written for the firefighter. Flash point (the lowest temperature at which enough vapor is present to form an ignitable mixture with air); upper and lower flammable limits; and the auto ignition temperature (AIT) are common properties included in this section.

FLINN SCIENTIFIC, INC. Safety Data Sheet (SDS)					SDS #: 181.00
<b>SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION</b>					
<b>n-Butyl Alcohol</b>					
Flinn Scientific, Inc. P.O. Box 219 Batavia, IL 60510 (800) 452-1261			Signal Word	<b>DANGER</b>	
CHEMTREC Emergency Phone Number: (800) 424-9300			Pictograms		
<b>SECTION 2 — HAZARDS IDENTIFICATION</b>					
Hazard class: Flammable liquids (Category 3). Flammable liquid and vapor (H226). Keep away from heat, sparks, open flames, and hot surfaces. No smoking (P210).					
Hazard class: Acute toxicity, oral (Category 4). Harmful if swallowed (H302). Do not eat, drink or smoke when using this product (P270).					
Hazard class: Skin corrosion or irritation (Category 2). Causes skin irritation (H315).					
Hazard class: Serious eye damage/eye irritation (Category 1). Causes serious eye damage (H318).					
Hazard class: Specific target organ toxicity, single exposure; respiratory tract irritation (Category 3). May cause respiratory irritation (H335).					
Hazard class: Specific target organ toxicity, single exposure; Narcotic effects (Category 3). May cause drowsiness or dizziness (H336). Avoid breathing mist, vapors or spray (P261).					
<b>SECTION 3 — COMPOSITION, INFORMATION ON INGREDIENTS</b>					
Component Name	CAS Number	Formula	Formula Weight	Concentration	
n-Butyl alcohol	71-36-3	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>2</sub> OH	74.12		
Synonym: 1-Butanol; n-Butanol					
<b>SECTION 4 — FIRST AID MEASURES</b>					
Call a POISON CENTER or physician if you feel unwell (P312).					
<b>If inhaled:</b> Remove victim to fresh air and keep at rest in a position comfortable for breathing (P304+P340).					
<b>If in eyes:</b> Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing (P305+P351+P338).					
<b>If on skin (or hair):</b> Immediately remove all contaminated clothing. Rinse skin with water (P303+P361+P353).					
<b>If swallowed:</b> Rinse mouth. Call a POISON CENTER or physician if you feel unwell (P302+P301+P312).					
<b>SECTION 5 — FIRE FIGHTING MEASURES</b>					
Class 1C flammable liquid.			NFPA CODE		
Flash point: 37 °C Flammable limits: Lower: 1.4% Upper: 11.2% Autoignition Temperature: 343 °C			H-2		
When heated to decomposition, may emit toxic fumes.			F-3		
<b>In case of fire:</b> Use triclass dry chemical fire extinguisher (P370+P378).			R-0		
<b>SECTION 6 — ACCIDENTAL RELEASE MEASURES</b>					
Remove all ignition sources and ventilate area. Contain the spill with sand or other inert absorbent material and deposit in a sealed bag or container. See Sections 8 and 13 for further information.					
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**H** The NFPA code is a numerical code established by the National Fire Protection Association. It rates the substance *under fire conditions* in four categories. **Health, Flammability, Reactivity,** and unusual reactivity: 4 is a severe hazard, 0 is no hazard.

**I** How to clean up a spill. Always remove unprotected personnel from area and make sure all students are safe. Contain the spill with sand or absorbent materials.

## How to Read A Safety Data Sheet (SDS), continued

Each Flinn SDS follows the same format and the information is always found in the same location, making it a valuable resource in the event of an emergency. With your first chemical order of the year, every teacher will receive a CD from Flinn Scientific containing all of our SDS. You may also request another CD at any time. Flinn SDS are updated on a regular basis, guaranteeing the most up-to-date safety information possible. Flinn sells a complete SDS Library in two versions, a hard copy version in two binders (Catalog No. AP7703, page 1206) or as part of the Flinn Online Chemventory program. For a more detailed description of the Flinn Online Chemventory program, please refer to pages 1196–1197. For our customers' convenience, Flinn has also placed a free complete set of SDS on our website. Simply go to [www.flinnsci.com](http://www.flinnsci.com) and click on the *Free SDS* button—individual SDS are easy to find and copies may be printed from your computer.

<b>FLINN SCIENTIFIC, INC.</b>	
<b>Safety Data Sheet</b>	<b>n-Butyl Alcohol</b>
	<b>SDS #:</b> 181.00
	<b>Revision Date:</b> September 25, 2015
<b>SECTION 7 — HANDLING AND STORAGE</b>	
Flinn Suggested Chemical Storage Pattern: Organic #2. Store with alcohols, glycols, amines, and amides. Store in a dedicated flammables cabinet. If a flammables cabinet is not available, store in Flinn Saf-Stor™ can. <b>J</b> Keep container tightly closed (P233). Keep cool (P235). Use only in a well-ventilated area or in a hood (P271).	
<b>SECTION 8 — EXPOSURE CONTROLS, PERSONAL PROTECTION</b>	
Wear protective gloves, protective clothing and eye protection (P280). Wash thoroughly after handling (P264). Use ventilation to keep airborne concentrations below exposure limits. Exposure guidelines: PEL 100 ppm (OSHA) TLV 20 ppm (ACGIH) <b>K</b>	
<b>SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES</b>	
Clear colorless liquid. Wine-like odor. Soluble: Water (20%). Miscible with alcohol and ether. <b>L</b>	Boiling point: 117.7 °C Melting point: -89 °C Refractive index: 1.3988 Specific gravity: 0.81
<b>SECTION 10 — STABILITY AND REACTIVITY</b>	
Avoid contact with aluminum, chromium trioxide, and oxidizing materials. Substance may develop explosive hydroperoxides. <b>M</b> Shelf life: Fair, substance may oxidize. See Section 7 for further information.	
<b>SECTION 11 — TOXICOLOGICAL INFORMATION</b>	
Acute effects: Absorbed through skin. Eye, skin, respiratory tract irritation. Dizziness. CNS depression. Chronic effects: N.A. <b>N</b> Target organs: Eyes, skin, respiratory system, central nervous system. N.A. = Not available, not all health aspects of this substance have been fully investigated.	ORL-RAT LD <sub>50</sub> : 790 mg/kg IHL-RAT LC <sub>50</sub> : 8000 ppm/4H <b>O</b> SKN-RBT LD <sub>50</sub> : 3400 mg/kg
<b>SECTION 12 — ECOLOGICAL INFORMATION</b>	
Data not yet available. <b>P</b>	
<b>SECTION 13 — DISPOSAL CONSIDERATIONS</b>	
Please review all federal, state and local regulations that may apply before proceeding. Flinn Suggested Disposal Method #18b is one option. <b>Q</b>	
<b>SECTION 14 — TRANSPORT INFORMATION</b>	
Shipping name: Butanols. Hazard class: 3, Flammable Liquid. UN number: UN1120. N/A = Not applicable <b>R</b>	
<b>SECTION 15 — REGULATORY INFORMATION</b>	
TSCA-listed, EINECS-listed (200-751-6), RCRA code U031. <b>S</b>	
<b>SECTION 16 — OTHER INFORMATION</b>	
<small>This Safety Data Sheet (SDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific, Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. The data should not be confused with local, state, federal or insurance mandates, regulations, or requirements and CONSTITUTE NO WARRANTY. Any use of this data and information must be determined by the science instructor to be in accordance with applicable local, state or federal laws and regulations. The conditions or methods of handling, storage, use and disposal of the product(s) described are beyond the control of Flinn Scientific, Inc. and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THIS PRODUCT(S). <b>T</b></small> <b>Consult your copy of the Flinn Science Catalog/Reference Manual for additional information about laboratory chemicals.</b>	
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### How can I prevent hazardous situations from occurring?

#### Sections 7–11.

**J** Use the Flinn Suggested Chemical Storage Pattern to prevent accidents and improve safety. Special storage and usage tips are also included.

**K** Wear personal protective equipment such as goggles, gloves, and an apron. See page 1226–1227 for an explanation of exposure guidelines.

**L** Clear, concise, and useful physical and chemical properties help you learn more about the chemicals you use. The first part describes the material's appearance. If it doesn't look like this, STOP. Do not use it. It may be more or less hazardous.

**M** Describes the conditions or reactions to be avoided. Also provides some indication about anticipated shelf life.

**N** More detail on how the material may injure you. Acute (short exposure) and chronic (long-term) effects are listed along with their target organs.

**O** Oral (ORL), inhalation (IHL), and skin absorption (SKN) toxicity data on test animals is included. For more information on LD<sub>50</sub>, see pages 1228–1229.

#### Other useful information. Sections 12–16.

**P** Ecological impact if large amounts (e.g., tank car) of the chemical spill near a river or lake.

**Q** Suggested disposal methods for laboratory quantities of chemicals. See pages 1268–1298 for Flinn Suggested Disposal Methods.

**R** Department of Transportation shipping information is included for your school district, emergency responders, and transport/shipping departments.

**S** Regulatory information used by regulatory compliance personnel.

**T** Flinn Scientific has an ongoing program to update its SDS. As professional chemists, we try our best to provide science teachers with the most accurate and useful safety information. Call Flinn if you have any questions. We can help!

# Appendix 3

## Suggested art safety training outline

### University safety resources

- Safety and Risk Management (SRM)
- Art Safety Guide

### Responsibilities

- SRM
- Departmental Safety Representatives (DSR) per department in the School of the Arts
- Art faculty/instructors
- Artists

### Emergency response procedures

- Fire emergency
- Hazardous material (SPILLS)
- Chemical exposure (eyewash locations)
- Injury/illness reporting
- Emergency action plans

### Potential hazards

- Studio specific safety hazards (See Appendix 1)

### Hazard control measures

- Engineering controls (local exhaust ventilation and machine guarding)
- Work practice controls (training, housekeeping and good work practices)
- Personal Protective Equipment (PPE)

### Fire safety

- Emergency Action Plan for respective School of the Arts buildings.
- Fire safety precautions
- Flammable/combustible liquids

### Personal protective equipment (PPE) and clothing

- A. Hazard assessment/hazards that may warrant PPE
  - Hand protection
  - Hearing protection
  - Eye and face protection
  - Respiratory protection

### Working Alone/Unsupervised

- Security
- B. Supervision

## IX. Waste Management and Disposal

- A. Types of waste
- B. Hazardous waste (handling, labeling, disposal)