



**THE OHIO STATE UNIVERSITY**

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## **Art Safety Program**

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## 1.0 Introduction

- 1.1 This Art Safety written safety program was developed to provide basic information for working safely with chemicals and all other operations completed at the Ohio State University Department of Art. This program is intended to supplement, but not replace, the safety guidelines set previously by the OSU Department of Art staff and faculty.

## 2.0 Responsibilities

- 2.1 OSU Environmental Health & Safety - The Ohio State University Office of Environmental Health & Safety (EHS) is responsible for the following:

- 2.1.1 Providing technical support, information and training, consultation, and all other safety-related questions regarding art safety.

- 2.2 Department Supervisors – Supervisors or department heads of areas where art operations are conducted are responsible for the following:

- 2.2.1 The oversight of health and safety within the department.

- 2.2.2 Is a principal contact for faculty, staff, and students to address health and safety issues or concerns.

- 2.2.3 Working with personnel to identify potential hazards associated with their operations.

- 2.2.4 Conducting Job Hazard Analyses (JHA) to identify hazards and protect employees from them.

- 2.3 Faculty and Staff – These employees are responsible for the following:

- 2.3.1 Ensure individuals understand the potential health and physical hazards of the chemicals and equipment used.

- 2.3.2 Explain proper and safe procedures for handling, under all circumstances, the hazardous substances used.

- 2.3.3 Provide appropriate equipment to allow all individuals to work safely.

- 2.3.4 Follow all procedures and practices outlined in the program.

- 2.3.5 Report all accidents to the Department Supervisor.

## 3.0 Emergency Procedures

- 3.1 For any emergency, including fire, explosions, accidents, and medical emergencies, dial 911 from any University phone.

### 3.2 Fire Emergencies

- 3.2.1 In the event of a fire, the Office of Public Safety should be notified immediately at 911.

- 3.2.2 Put the fire out if you know how to do so without endangering yourself or others.

- 3.2.2.1 If you have been trained in the use of a fire extinguisher, fight the fire from a position where you can escape, only if you are confident that you can put out the fire.
- 3.2.3 If the fire is large or spreading, activate the fire alarm to alert building occupants. Leave the area and close all doors to prevent the fire from spreading further.
- 3.2.4 Evacuate the building and wait for the arrival of emergency services. Be prepared to inform them of the exact location and details of the fire.
- 3.2.5 Do not re-enter the building until you are told by emergency personnel to do so.

### 3.3 Chemical Exposures

#### 3.3.1 Chemicals on Skin

- 3.3.1.1 Immediately flush with water for no less than 15 minutes. Remove any jewelry or clothing that has become contaminated to facilitate removal of any residual material.
- 3.3.1.2 If immediate medical attention is needed, dial 911. Explain what chemicals were involved.
- 3.3.1.3 Review the Safety Data Sheet (SDS) to determine if any delayed effects should be expected.

#### 3.3.2 Chemicals in Eyes

- 3.3.2.1 Flush eye(s) with water for at least 15 minutes. The eyes must be forcibly held open to wash, and the eyeballs must be rotated so all surface area is rinsed.
- 3.3.2.2 Remove contact lenses while rinsing. Do not reinsert contact lenses after rinsing.
- 3.3.2.3 Seek medical attention regardless of the severity. Review the SDS to determine if any delayed effects are expected.

#### 3.3.3 Chemical Inhalation

- 3.3.3.1 Close containers, open windows, or increase ventilation and move to fresh air.
- 3.3.3.2 If symptoms such as headache, nose/throat irritation, dizziness persist, seek immediate medical attention.
- 3.3.3.3 Review the Safety Data Sheet (SDS) to determine if any delayed effects should be expected.

#### 3.3.4 Ingestion of Chemicals

- 3.3.4.1 Immediately call 911 or a Poison Control Center for instructions.
- 3.3.4.2 Review the Safety Data Sheet (SDS) to determine if any delayed effects should be expected.

### 3.3.5 Injection of Chemicals

3.3.5.1 Wash the area with soap and water.

3.3.5.2 Seek medical attention, if necessary. Explain what chemicals were involved.

3.3.5.3 Review the Safety Data Sheet (SDS) to determine if any delayed effects should be expected.

## 4.0 Hazard Communication

### 4.1 Hazard Evaluation

4.1.1 Manufacturers, importers, or distributors of chemicals are required to assess the physical and health hazards of their products. This information must be recorded on the product label and included in a Safety Data Sheet (SDS).

### 4.2 Labeling

4.2.1 The manufacturer must label containers with the chemical name, hazard warnings, and the manufacturer's name and address.

4.2.2 The manufacturer's label must not be removed or defaced. If the product is transferred from one container to another, the new container must be labeled with the product name and appropriate hazard warnings.

### 4.3 Safety Data Sheets

4.3.1 All areas where art operations take place must obtain and maintain a SDS for each hazardous material. These must be available to individuals working with the products during all hours.

### 4.4 Written Hazard Communication Program

4.4.1 The Ohio State University Office of Environmental Health and Safety has developed a written Hazard Communication Program that can be referenced for any additional questions.

4.4.2 This program can be found online at <http://www.ehs.osu.edu/OccHealthSafety/HazardComm.aspx>

### 4.5 Contractors

4.5.1 Supervisors must inform outside contractors of the potential hazards which may be encountered during their work. This includes giving contractors access to the Hazard Communication Program, the hazardous chemical inventory, and the SDS's for all chemicals.

### 4.6 Training

4.6.1 All individuals who work with hazardous materials must receive training. General Hazard Communication classroom and online training modules are available through EHS.

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- 4.6.2 Specific information about hazardous materials is provided to students by faculty. Each faculty member is responsible for informing workers of:
    - 4.6.2.1 The location and availability of the written Hazard Communication Program, the chemical inventory, and SDS's.
    - 4.6.2.2 The nature and potential health and safety risk of specific hazardous substances to which individuals may be exposed in the course of their work.
    - 4.6.2.3 The proper handling, under all circumstances, of hazardous materials in the workplace.
    - 4.6.2.4 The appropriate emergency treatment for exposures.
    - 4.6.2.5 Procedures for cleaning up leaks and spills.
    - 4.6.2.6 The location of hazardous materials in the workplace.
  - 4.6.3 Department supervisors are responsible for assuring that employees attend training and recordkeeping.

## 5.0 Personal Protective Equipment

### 5.1 Hand Protection

- 5.1.1 Gloves should be worn whenever the possibility of skin contact with hazardous chemicals or physical hazards (heat) exists.
- 5.1.2 The following guidelines should be used to determine the appropriate glove.
  - 5.1.2.1 Review the SDS for the chemical of interest
  - 5.1.2.2 Determine which glove material offer the best resistance to the chemical. This information may be found in the SDS.

### 5.2 Respiratory Protection

- 5.2.1 The use of a respirator is subject to prior review by EHS.
- 5.2.2 Any employee who believes that respiratory protection is needed must notify EHS for evaluation of the hazard and enrollment into the OSU Respiratory Protection Program.
- 5.2.3 Any employee must be medical cleared and conduct a respirator fit test before wearing a respirator.

### 5.3 Eye Protection

- 5.3.1 Safety glasses/goggles should be worn for protection from impact hazards.
- 5.3.2 Safety goggles should be worn when a potential splash from a hazardous material exists.
- 5.3.3 Face shields are used in conjunction with safety glasses/goggles when working with large volumes of hazardous materials.

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## 5.4 Body Protection

- 5.4.1 When the possibility of chemical contamination exists, protective clothing should be worn over normal clothes.
- 5.4.2 Plastic or rubber aprons are best for protection from corrosive or irritating materials.
- 5.4.3 Loose or torn clothing and unrestrained hair may also pose a hazard.
- 5.4.4 Open-toed shoes should not be worn in chemical use areas or where mechanical work is being performed.

## 6.0 Compressed Gases

### 6.1 Primary Hazards

#### 6.1.1 Fire and Explosion

6.1.1.1 Fire and explosion are the primary hazards associated with flammable gases, oxygen, and other oxidizing gases.

6.1.1.2 Flammable gases can be ignited by static electricity or by a heat source.

#### 6.1.2 High Pressure

6.1.2.1 All compressed gases are potentially hazardous because of the high pressure stored inside the cylinder.

6.1.2.2 A sudden release of pressure can cause injuries.

#### 6.1.3 Improper Handling

6.1.3.1 Improper handling of cylinders could result in sprains, strains, and falls.

6.1.3.2 Other hazards such as fire, explosion, chemical burns, and poisoning could occur if gases accidentally escape from the cylinder due to mishandling.

### 6.2 Handling, Storage, and Use of Gases

6.2.1 Only persons familiar with the hazards should handle compressed gas cylinders.

6.2.2 All cylinder movement should be done with material handling equipment.

6.2.3 Always secure the cylinders when in storage or use.

6.2.4 Wear appropriate PPE when handling cylinders.

6.2.5 Cylinder caps should not be removed until the cylinder is secured in place and ready for use.

### 6.3 Storage Precautions

#### 6.3.1 Things to Keep Away from Cylinders

- 6.3.1.1 Compressed gas cylinders should not be exposed to sparks, flames, or temperatures above 125 degrees Fahrenheit.
- 6.3.1.2 Cylinders should not be located where they could come into contact with any electrical apparatus.
- 6.3.1.3 Smoking and open flames should not be permitted in areas used for storage of oxygen or flammable gases.
- 6.3.1.4 Never allow grease, oil, or other combustible substances to come into contact with oxygen or other oxidizing gas cylinders.
- 6.3.1.5 Do not attempt to repair a leaking gas cylinder and call for assistance immediately.

## **7.0 Hazardous Material Spill Response**

- 7.1 Spills of hazardous materials should be confined in a safe manner.
- 7.2 In case of a hazardous spill:
  - 7.2.1 Alert others in the immediate area and evacuate if necessary.
  - 7.2.2 If the spill cannot be handled safely by employees, notify Public Safety or EHS immediately.
  - 7.2.3 Report the following details of the spill:
    - 7.2.3.1 Location of the spill
    - 7.2.3.2 Chemical name
    - 7.2.3.3 Approximate quantity spilled and other important information

## **8.0 Waste Disposal**

- 8.1 There are several types of wastes that can be generated within the OSU Department of Art.
- 8.2 Many of these wastes are considered hazardous wastes by the US Environmental Protection Agency (EPA) and require special handling.
- 8.3 These materials may not be poured down a drain. Please contact EHS on disposal questions, requests, and pickup appointments for the following materials:
  - 8.3.1 Oily Rags
    - 8.3.1.1 Oily rags must be placed in a designated and labelled container.
  - 8.3.2 Solvents
    - 8.3.2.1 Solvents such as paint thinner, turpentine, xylene, and alcohols are considered hazardous waste.



### 8.3.3 Paints

8.3.3.1 Oil-based paints are considered hazardous waste.

8.3.3.2 Oil-based paints may be mixed with solvents and linseed oil for disposal purposes.

8.3.3.3 Latex paints should be dried out and placed in regular trash.

8.3.3.4 Water-based paints may be disposed via the regular trash.

### 8.3.4 Linseed Oil

8.3.4.1 Because of its potential for fire, linseed oil should be handled as hazardous waste, in a similar manner as solvents.

### 8.3.5 Ceramic Glaze

8.3.5.1 Many ceramic glazes contain metals that are considered hazardous waste.

8.3.5.2 Unused portions of the glazes should be disposed as hazardous waste.

### 8.3.6 Photographic Chemicals

8.3.6.1 Standard developers and rinses can be rinsed down the drain during processing.

8.3.6.2 Most fixers contain silver and should be collected as hazardous waste.

8.3.6.3 Specialized chemicals, such as special acids and bases, should be assumed to be hazardous waste and disposed of accordingly.

### 8.3.7 Acids and Bases

8.3.7.1 Materials with a pH of less than 2 or more than 12.5 are considered hazardous waste.

8.3.7.2 Do not mix these wastes with solvents or oil wastes.

### 8.3.8 Empty Chemical Containers

8.3.8.1 Empty chemical containers should be triple rinsed and recycled or placed in regular trash.

## 8.4 Handling Hazardous Waste

8.4.1 Materials that are to be disposed of as hazardous waste must be placed in sealable containers.

8.4.2 Containers must be kept closed except during actual transfers.

8.4.3 Waste containers must be labeled as Hazardous Waste as soon as the material is first put into the container.

## 9.0 Ceramics

- 9.1 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 concern about lead and other metals leaching into food and drink from pottery fired with certain glazes. Carefully review SDS for the products used.
- 9.2 Do not use kilns, mixers, or other pieces of equipment until you have been trained by a properly trained faculty member.
- 9.3 Substitute less hazardous clays and glazes whenever possible.
- 9.4 Wear non-slip shoes in the mixer area or other areas where wet floors may be present.
- 9.5 Use proper lifting techniques when handling large bags of clay or other heavy materials.
- 9.6 Wet mop floors and work surfaces daily to minimize dust levels and prevent dry scraps from becoming pulverized.
- 9.7 Wash your hands with soap and water after working with clays and glazes.

Activity	Hazards	Precautions
Working with clay	<ul style="list-style-type: none"> <li>• Clays contain crystalline silica which can cause lung diseases.</li> <li>• Some clay additives may be contaminated with asbestos and other hazardous contaminants.</li> <li>• Handling/mixing clay in powder form can cause an inhalation hazard.</li> </ul>	<ul style="list-style-type: none"> <li>• Review the SDS</li> <li>• Avoid creating dust</li> <li>• Wear a dust mask if necessary</li> </ul>
Handling glazes/frits	<ul style="list-style-type: none"> <li>• Glazes can contain free silica and highly toxic metals such as lead.</li> <li>• Handling/mixing glazes in powder form can cause an inhalation hazard.</li> </ul>	<ul style="list-style-type: none"> <li>• Review the SDS</li> <li>• Avoid creating dust</li> <li>• Use a fume hood or wear a dust mask if necessary</li> <li>• If possible, avoid spray application of glazes which can create aerosols</li> </ul>
Firing kiln	<ul style="list-style-type: none"> <li>• Toxic gases and fumes may be emitted during the firing process.</li> <li>• Infrared radiation produced by the glowing fire can cause cataracts after long periods of exposure.</li> <li>• Heat generated by a kiln can cause thermal burns.</li> </ul>	<ul style="list-style-type: none"> <li>• Use exhaust ventilation</li> <li>• Wear shaded lenses when looking into kiln</li> <li>• Wear leather gloves when handling hot objects</li> <li>• Do not store flammable and combustible materials near kilns.</li> </ul>

## 10.0 Drawing/Painting

- 10.1 Hazards associated with painting/drawing are related to 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 by the skin. Carefully review SDS for the products used and review specific hazard control measures.
- 10.2 Substitute less hazardous materials whenever possible.
- 10.3 Avoid use of pigments which contain toxic metals.
- 10.4 Hazardous fumes may be produced when coated surfaces are heated.
- 10.5 Do not use solvents to clean skin. Remove paint from skin with baby oil then use soap and water.
- 10.6 Wash your hands with soap and water after working with painting and drawing materials.

Activity	Hazards	Precautions
Painting and solvent use	<ul style="list-style-type: none"> <li>• Mixing dry powders and sanding can create inhalation and ingestion hazards</li> <li>• Some natural resins may cause skin irritation or allergies</li> <li>• Some solvents and vehicles used in paints can evaporate and contaminate the air</li> <li>• Some solvents can be absorbed through the skin and can cause dermatitis with prolonged exposure</li> <li>• Many solvents are flammable</li> </ul>	<ul style="list-style-type: none"> <li>• Review the SDS</li> <li>• Mix dry pigments in a chemical fume hood</li> <li>• Wear a dust mask or N95 respirator if necessary</li> <li>• Avoid skin contact with solvents. Wear nitrile gloves</li> <li>• Wash hands before eating or drinking</li> </ul>
Spray application	<ul style="list-style-type: none"> <li>• Airbrushes and aerosol spray cans release very fine mist particles that can remain in the air for several hours and can be inhaled</li> <li>• Aerosol spray paints contain propellants that are flammable</li> <li>• Spray application of some solvents and paints can create a flammable atmosphere</li> </ul>	<ul style="list-style-type: none"> <li>• Never spray solvent-based materials in or near the building except in designated spray booths</li> <li>• Use water-based airbrushing paints and inks rather than solvent-based</li> </ul>
Drawing media	<ul style="list-style-type: none"> <li>• Pastels can contain toxic pigments which can be hazardous by inhalation or accidental ingestion</li> <li>• Spray fixatives contain toxic solvents and flammable propellants</li> <li>• Some drawing inks and permanent felt tip markers can contain solvents</li> </ul>	<ul style="list-style-type: none"> <li>• Wet wipe or mop dusty surfaces</li> <li>• Wear a dust mask or N95 respirator if necessary</li> <li>• Never spray fixative in or near the building except in designated spray booths</li> </ul>

## 11.0 Glassmaking

- 11.1 There are a number of hazards associated with glassmaking such as burns, sharp objects, hazardous chemicals in glass, heat exposure, carbon monoxide, and eye damage from optical radiation and flying objects. Carefully review the SDS for the products used.
- 11.2 Do not use furnaces or other pieces of equipment until you have been trained by faculty.
- 11.3 Wear appropriate eye protection.
- 11.4 Wear natural fiber clothing and sturdy shoes or boots.
- 11.5 Remove watches and jewelry. Tie long hair back.
- 11.6 Remove butane lighters from pockets when working around heat sources.
- 11.7 Dispose of hot glass properly. Never dispose in regular trash.

Activity	Hazards	Precautions
Hot Work	<ul style="list-style-type: none"> <li>Burns</li> <li>Clothing can melt or catch on fire</li> <li>Prolong work in a hot environment can cause heat stress</li> <li>Hot glass can release toxic gases and metal fumes</li> </ul>	<ul style="list-style-type: none"> <li>Wear Kevlar gloves when handling hot objects</li> <li>Be careful not to grab hot objects</li> <li>Wear cotton or wool clothing</li> <li>Drink plenty of water and take breaks as necessary</li> <li>If desired, wear a heat resistant face shield in addition to eye protection</li> </ul>
Cold Work	<ul style="list-style-type: none"> <li>Glass can contain heavy metals that can be poisonous if inhaled or ingested</li> <li>Sand contains crystalline silica which can be an inhalation hazard</li> </ul>	<ul style="list-style-type: none"> <li>Review the SDS</li> <li>Use least hazardous materials whenever possible</li> <li>Avoid creating dust</li> <li>Wear a dust mask if necessary</li> </ul>
Looking into furnace	<ul style="list-style-type: none"> <li>Optical radiation from the glowing fire can cause cataracts and other eye damage</li> </ul>	<ul style="list-style-type: none"> <li>Wear tinted eye protection NOT sunglasses</li> </ul>
Glass handling, recycling, crushing	<ul style="list-style-type: none"> <li>Cracked and flying glass can form as glass cools</li> <li>Glass can cut or puncture or cut skin</li> </ul>	<ul style="list-style-type: none"> <li>Wear safety glasses</li> <li>Wear cut resistant gloves</li> </ul>
Operation of gas burning equipment	<ul style="list-style-type: none"> <li>Carbon monoxide can be produced if flame in furnace or pipe warmer is not burning properly</li> <li>Gas leaks</li> <li>Use of lighter fluid on torches</li> </ul>	<ul style="list-style-type: none"> <li>Do not use equipment if not properly trained</li> <li>Make sure good ventilation is provided</li> <li>Periodically inspect all gas line connections with soapy water</li> <li>If gas odor is noted, turn off gas supply and check for leaks or evacuate</li> </ul>

## 12.0 Photography

- 12.1 Multiple chemical hazards exist in the developing process of photography. 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 by the skin. Carefully review SDS for the products used and review specific hazard control measures.
- 12.2 Do not use processing chemicals and equipment until you have properly trained.
- 12.3 Substitute less hazardous materials whenever possible.
- 12.4 Dispose of waste chemicals properly. Contact EHS for assistance if needed.
- 12.5 Wash your hands with soap and water after working with processing chemicals.

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	<ul style="list-style-type: none"> <li>• Review the SDS</li> <li>• Avoid skin contact with chemicals and wear appropriate PPE</li> <li>• Wash hands before eating or drinking</li> </ul>
	Some processing chemicals emit a variety of respiratory irritants. Exposure to these can cause increased susceptibility to respiratory infections	<ul style="list-style-type: none"> <li>• Always mix concentrated solutions in a well-ventilated area or fume hood</li> <li>• Keep working solutions covered when not in use</li> <li>• Make sure local and dilution ventilation systems are working properly</li> </ul>
	Many chemicals used in photo processing are highly toxic if ingested	<ul style="list-style-type: none"> <li>• Wash hands before eating or drinking</li> <li>• Don't put processing chemicals in food or drink containers</li> </ul>
	Highly irritating and toxic substances can be produced and become airborne if stock or working solutions are mixed with incompatible materials	<ul style="list-style-type: none"> <li>• Do not mix stock solutions with incompatible materials</li> <li>• Store incompatible materials separately</li> <li>• Label all containers</li> </ul>
	Water and other liquids may be used in the vicinity of electrical equipment	<ul style="list-style-type: none"> <li>• Separate electrical equipment from water sources</li> <li>• Install ground fault circuit interrupters on all electrical outlets within 5 feet of water sources</li> </ul>

### 13.0 Printmaking/Lithography

- 13.1 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 by the skin. Carefully review SDS for the products used and review specific hazard control measures.
- 13.2 Do not use presses until you have been properly trained.
- 13.3 Substitute less hazardous materials whenever possible.
- 13.4 Dispose of waste properly.
- 13.5 Remove paint from skin with baby oil or soy-based cleansers then use soap and water. Don't use solvents.
- 13.6 Wash your hands with soap and water after working with painting and drawing materials.

Activity	Hazards	Precautions
Use of inks, pigments, solvents	<ul style="list-style-type: none"> <li>• Some solvents and vehicles used in paints can evaporate quickly and contaminate the air creating an inhalation hazard</li> <li>• Some solvents can be absorbed through the skin and can cause dermatitis with prolonged exposure</li> <li>• Many solvents are flammable</li> </ul>	<ul style="list-style-type: none"> <li>• Review the SDS</li> <li>• Mix dry pigments in a chemical fume hood</li> <li>• Wear a dust mask or N95 respirator if necessary</li> <li>• Avoid skin contact with solvents. Wear nitrile gloves</li> <li>• Wash hands before eating or drinking</li> </ul>
Acid handling	<ul style="list-style-type: none"> <li>• Contact with acids can irritate skin and mucous membranes and can cause chemical burns</li> <li>• Acid spills can damage clothing and equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Always wear chemical splash goggles and neoprene gloves when handling acids</li> <li>• Only authorized persons are allowed to mix acids</li> <li>• Mix acid solutions in a fume hood</li> </ul>
Moving lithography stones	<ul style="list-style-type: none"> <li>• Back injuries may occur from lifting heavy stones</li> </ul>	<ul style="list-style-type: none"> <li>• Use mechanical lift or get help when moving large stones</li> </ul>
Use of non-powered hand tools	<ul style="list-style-type: none"> <li>• Sharp or pointed tools can cause cuts or puncture wounds</li> <li>• Frequent or prolonged use of hand tools can cause carpal tunnel syndrome</li> </ul>	<ul style="list-style-type: none"> <li>• Cut away from the body and keep hands clear of blade</li> <li>• Store tools safely</li> <li>• Use ergonomically designed tools that fit the hand well</li> </ul>

## 14.0 Sculpture – Woodworking

- 14.1 Woodworking hazards include the wood itself, preservatives that may be present in the wood, hand and machine tools used to shape it, glues, and finishing compounds. Carefully review SDS for the wood and other products used.
- 14.2 Do not use mechanical equipment until you have been properly trained.
- 14.3 Substitute less hazardous materials whenever possible.
- 14.4 Use proper lifting techniques when handling heavy materials.
- 14.5 Clean floors and work surfaces after use.

Activity	Hazards	Precautions
Working with wood	<ul style="list-style-type: none"> <li>• Dusts from many woods are sensitizers can cause allergic reactions</li> <li>• Some woods may be toxic or treated with chemical preservatives</li> <li>• Dust produced during cutting/sanding operations can present inhalation hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Review the SDS</li> <li>• Use tools and equipment that is equipped with a dust collection system</li> <li>• Clean up wood dust and debris frequently</li> </ul>
Operating mechanical equipment	<ul style="list-style-type: none"> <li>• Improper use of equipment can cause serious injuries</li> <li>• Clothing, hair, fingers can get caught in moving equipment</li> <li>• Prolonged exposure to high noise levels can cause hearing loss</li> <li>• Extended use of vibrating hand tools can cause damage to the muscles and tendons of the hands</li> </ul>	<ul style="list-style-type: none"> <li>• Do not use equipment unless trained</li> <li>• Keep guards in place</li> <li>• Use push sticks</li> <li>• Remove jewelry, tie long hair back, and roll up sleeves</li> <li>• Wear appropriate PPE</li> </ul>
Using non-powered hand tools	<ul style="list-style-type: none"> <li>• Sharp or pointed tools can cause cuts or puncture wounds</li> <li>• Frequent or prolonged use of hand tools can cause carpal tunnel syndrome</li> </ul>	<ul style="list-style-type: none"> <li>• Cut away from the body and keep hands clear of blade</li> <li>• Store tools safely</li> <li>• Use ergonomically designed tools that fit the hand well</li> </ul>
Working with hazardous materials	<ul style="list-style-type: none"> <li>• Some materials contain toxic chemicals that can be hazardous by inhalation or skin contact</li> <li>• Some materials are flammable</li> </ul>	<ul style="list-style-type: none"> <li>• Review the SDS</li> <li>• Apply hazardous materials in a well-ventilated areas</li> <li>• Wear gloves to protect skin from hazardous materials</li> <li>• Keep containers closed when not used</li> <li>• Dispose of solvent soaked rags properly</li> </ul>

## 15.0 Sculpture – Metalworking

- 15.1 The hazards associated with metalworking depend on the type of work performed and methods used. Melting metal can produce toxic gases as well as metal fumes. Carefully review SDS for the products used.
- 15.2 Do not use equipment until you have been properly trained.
- 15.3 Substitute less hazardous materials whenever possible.
- 15.4 Use a welding curtain to shield your work from others.
- 15.5 Never store chlorinated hydrocarbons or flammable materials near the welding area.
- 15.6 Do not let molten metal come in contact with water, grease, oil, or other organic materials.

Activity	Hazards	Precautions
Metal casting	<ul style="list-style-type: none"> <li>Sand has a high silica content which can become airborne and create an inhalation hazard</li> <li>Toxic metal fumes can be produced</li> <li>Welding and furnaces can generate combustion gases</li> <li>Furnaces release a lot of heat and infrared radiation that can lead to heat stress</li> <li>Molten metal can burn organic resins and binders in the sand mold and release toxic decomposition products</li> </ul>	<ul style="list-style-type: none"> <li>Review the SDS</li> <li>Use silica-free sand</li> <li>Work in well ventilated area</li> <li>Be sure exhaust system on furnace is working</li> <li>Work in pairs when pouring molten metals into molds</li> <li>Never pour directly over cement or water</li> </ul>
Metal forging	<ul style="list-style-type: none"> <li>Shaping hot or cold metal with hammers can generate high noise levels and crushing injuries</li> <li>Molten metal can cause severe burns</li> </ul>	<ul style="list-style-type: none"> <li>Wear eye and hearing protection</li> <li>Wear heat resistant gloves and other protective clothing</li> <li>Be sure tools are in good condition</li> </ul>
Welding, brazing, soldering	<ul style="list-style-type: none"> <li>A number of air contaminants are produced including toxic metal fumes and gases</li> <li>Base metals that are coated with paint can release toxic materials when heated</li> <li>Welding can produce UV and infrared radiation</li> <li>Heat and slag can cause serious burns and fires</li> </ul>	<ul style="list-style-type: none"> <li>Review SDS</li> <li>Remove any preservative coatings from base metal before welding or cutting</li> <li>Work in a well-ventilated area</li> <li>Wear eye protection</li> <li>Wear natural fiber clothing, closed-toed shoes, leather gloves, and protective clothing</li> </ul>
Operating mechanical equipment	<ul style="list-style-type: none"> <li>See above in Sculpture-Woodworking</li> </ul>	<ul style="list-style-type: none"> <li>See above in Sculpture-Woodworking</li> </ul>