Reed College Visual Arts Safety Manual

August 2024

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Emergency Information

Emergency (Fire, Police, Ambulance)	911
Community Safety	503-788-6666
Reed Health & Counseling (M-F 9am-5pm)	503-777-7281
Physical Plant Maintenance	503-777-7283
Environmental Health & Safety	503-777-7788
Poison Control Center (OHSU)	800-222-1222
Providence Hospital Emergency Room	503-215-6000

Please write the locations of…

Nearest Fire Alarm Pull Station:

Nearest Fire Extinguisher:

Nearest Emergency Shower/Eyewash:

Nearest First Aid Kit:

Nearest Spill Kit:

Outside Assembly Point Location:

Nearest Automated External Defibrillator:

Shelter-in-Place Location:

SDS Location:

Emergency Instructions

In Case Of Fire:

1. Leave the immediate area, closing all doors behind you.
2. Sound alarm by pulling handle on the fire alarm.
3. Dial 911 to contact the fire department.
4. Use a portable fire extinguisher only if you have been trained to use one and the fire is very small. Sound the fire alarm before using a portable extinguisher.

In Case Of Injury:

1. Get first aid immediately, if needed. If chemicals are on skin or in eyes, immediately flush affected areas with water.
2. If possible, remove the victim from the immediate cause of injury. Report injury to instructor. If an instructor is not available call Community Safety (503-788-6666).
3. If bodily fluids are involved, refer to the Blood-Borne Pathogens section on page 19.

In Case Of Spill or Leak:

1. Turn off all ignition sources and open all outside doors/windows to let any flammable vapors escape.
2. Call Community Safety (503-788-6666) or Environmental Health and Safety (503-777-7788).
3. If a spill or leak produces hazardous vapors, evacuate the area immediately.
4. Use a spill kit, if applicable, to contain spill/leak so it will not spread further. Wear appropriate protective equipment.

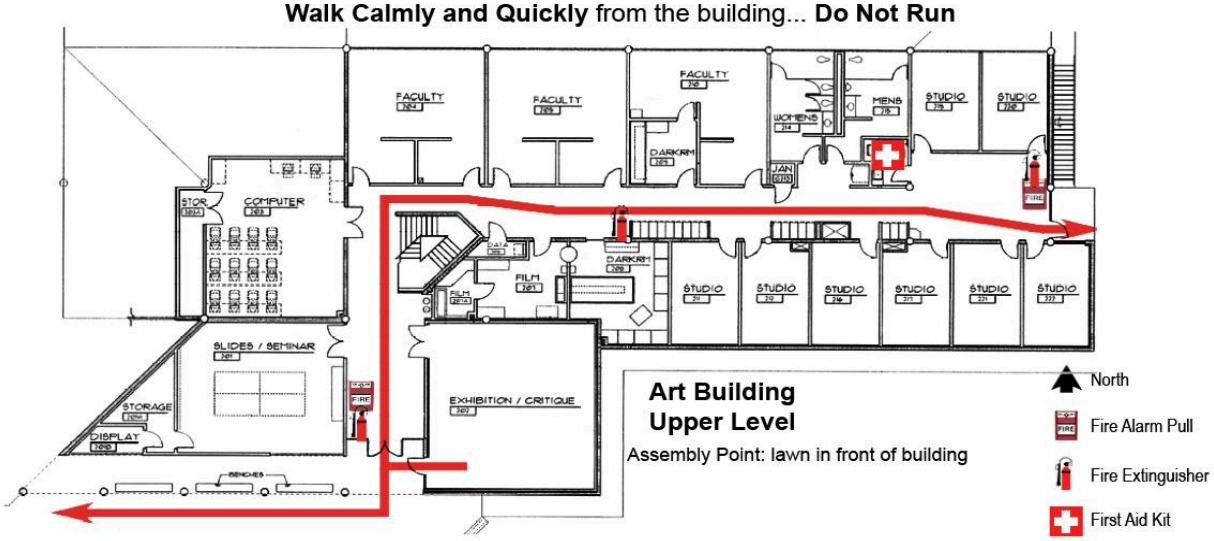
When Reporting an Emergency:

1. Give exact location of emergency (building, room, etc.).
2. Give your name and phone number of your location.
3. Describe the nature of emergency (fire, leak, spill, injury, etc.).
4. Stay near the phone, if possible, for additional instructions.

In the event of a fire:

Choose closest exit from building

Walk Calmly and Quickly from the building... **Do Not Run**



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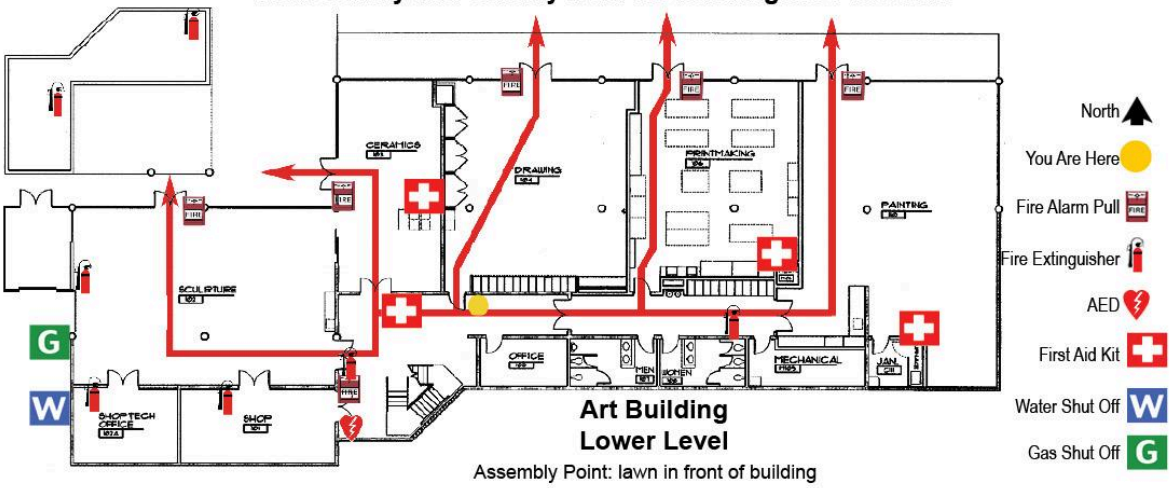


1.0 Introduction

Common hazards you may encounter in the Art Studio include:

- Exposure to hazardous chemical compounds found in many art media.
- Exposure to hazardous physical conditions such as extreme temperatures, impulse and/or constant noises, ultraviolet and/or infrared radiation, as well as conditions conducive to injuries such as lacerations, bruises, and sprains.
- Possibility of repetitive-motion injuries, lifting injuries, or circulatory/nerve damage from the use of high vibration tools.

The hazards presented by many chemicals are of concern not only during their actual use, but also afterward, during their disposal. Improper disposal can cause many negative effects for people, plants, animals, and the surrounding environment. You can be exposed to these substances through inhalation, ingestion, or absorption via skin contact. Be a responsible artist and educate yourself on your media and process of choice every time you begin a project. Failure to do so may result in injury or illness for yourself or your fellow artists. Use tools and equipment with caution, and if you are unsure about something, ASK!

2.0 Basic Precautions

Know what you are working with:

- Read the packaging labels and follow the directions and precautions.
- Substitute safer materials whenever possible. Ask your instructor about substitution options if you are concerned about the safety of a substance.
- Know proper storage and handling of your materials.
- Label all containers. Clearly list their contents and special hazards
- NEVER use food vessels as secondary containers!
- Safety Data Sheets (SDSs), previously called Material Safety Data Sheets (MSDSs), detail compositional and safety information about all materials provided by the school and can be searched in the Reed College VelocityEHS SDS Library. This database can be accessed through the Environmental Health and Safety website or at this link.
- Refer to Appendix C: Communicating Chemical Hazards for more information about SDSs and chemical labels.

Never work alone or without having been properly trained when working with hazardous/dangerous materials or equipment. Avoid working late at night whenever possible -- if it is absolutely necessary, try to have a partner present. Know that other artists in the studio can produce hazards that affect you. Be aware of possible problems caused by their processes, such as protecting yourself from loud background noise levels from power tools, protecting yourself from hazardous airborne particles or vapors produced by those working nearby, and being aware of anyone in the room working with an allergen.

Always wear appropriate personal protective equipment (PPE):

- Maintain a set of "studio clothes" for messy work that are kept (and washed) separately from your "street clothes." Working in your street clothes can result in hazardous chemical contaminants polluting your home/dorm, and endangering your friends, family, and pets.
- If you are working with particularly hazardous materials, contact Environmental Health & Safety to obtain disposable coveralls to minimize possible studio to home contamination.
- Wear sturdy, closed-toed shoes whenever working on a project. No sandals or bare feet!
- Ask your instructor about safety goggles, gloves, dust masks and ear protection–a variety of appropriate protective equipment is available to suit particular hazards. Watch your hands for any cracks or lacerations–an open wound can give a chemical direct access to your bloodstream.
- Respirators are available through Environmental Health & Safety (503-777-7788) for extremely hazardous projects, but training and medical testing are required before they may be used.

Use tools and equipment according to their intended functions. NEVER remove safety guards when using equipment. If there is a malfunction or failure with the tools or equipment, do NOT continue using it or attempt to fix it yourself! Take it to your instructor and explain the problem immediately if possible, or if no one is available, clearly label it as needing repair.

Work in a well-lit and well-ventilated area. Many art processes produce toxic particles, fumes, and vapors, such as painting, printmaking, ceramics, welding, nitric acid etching, and many others. Work with these media outdoors. A portable dust/fume extractor is available for welding. Do not forget to go outside to work with dust-producing media such as stone, plaster, and wood. All spray finishing operations need to be conducted outside.

Have regular medical check-ups. Let your doctor know the hazardous chemicals you have worked with and if you have any concerns.

Be aware of preexisting conditions that might put you at a higher risk for adverse effects caused by your media of choice (i.e., if you have allergies, asthma, diabetes, kidney problems, etc., or if you are a heavy smoker). If you have any of these conditions or are sensitive to solvents, paints, etc., extra precautions are in order. Please alert your instructor and/or contact Environmental Health & Safety (503-777-7788) if this is the case.

Use extra care if you are pregnant, nursing, or work with young children outside of your studio time. Many art media have not been tested for fetotoxicity or long-term exposure effects, and children are susceptible to smaller amounts of hazardous materials than adults are. This is particularly important with regard to often-overlooked toxic pigments (in paints, glazes, and other colored art media) as well as more commonly known toxins found in various art materials.

Limit your studio work to times when you are well-rested and sober.

To help minimize the risk of fire:

- Keep your area clean and free of litter.
- Never block fire exits and lanes.
- Do not use candles or other open flames in the studios.
- Dispose of oily or solvent-soaked rags in designated covered containers ONLY; oily rags may spontaneously combust. (oily/solvent-soaked rag safety information can be found on page 21)
- Use only heavy-duty extension cords with built-in surge protectors.
- Avoid using appliances that have exposed heating coils- i.e. space heaters, hair dryers, etc.

2.1 Personal Hygiene and Studio Cleanliness

Know your materials, your tools, and your safety resources. The same precautions you would use in the chemistry lab should be used in the process of making art.

- Leave all food and drink outside any studio/classroom. There is a kitchenette area on the upper floor of the building available for safe food preparation.
- Do not place any foreign substance into your mouth, including your brush, hands, pen, etc. while working. Pay special attention to keeping your fingernails clean, and avoid biting them–you can accidentally ingest chemicals quite easily this way.
- Wash hands carefully with soap and water after each class, before breaks, and especially before smoking or eating. Smoking with chemical residue on your fingers puts you at higher than usual risk because some chemicals become more dangerous when inhaled after being heated. Never use a solvent to clean your hands. Baby oil may be used to safely remove oil paint or other oil based media, along with soap and water.

2.2 Outdoor Projects

Outdoor projects are encouraged and approved on a case by case basis. The concrete area in front of the building and the lawn directly west are great areas for sculpture. Installations on the hillside to the south of the building are generally ok, but need approval from Grounds Crew. Installations in the canyon are possible, but many more limitations exist. All requests for installations must be submitted to the Grounds Manager before the installation. A proper proposal must include a short description of the project scope, desired location, a diagram showing dimensions, materials requested if using campus resources, and set-up and take down dates.

2.3 Home/Dorm Room Contamination

Contamination of your home or living space can pose a serious health problem. Chemicals brought home on your clothes can greatly increase your exposure. Wash contaminated clothing separately from street clothes. Use food-preparation utensils or containers for food only. Even if something is used just once in the studio, NEVER use it again in the kitchen.

2.4 Health Effects of Toxic Substances

Types of Contact/Routes of Exposure

- **Skin contact and absorption:** Substances can enter the body through cuts or scrapes, as well as through absorption. Chemicals can enter the bloodstream through your skin and travel throughout your body. .
- **Inhalation**: Breathing air that contains materials such as fumes, mists, vapor, dust, clay, plaster, and paint, causes these contaminants to contact the sensitive and highly permeable mucus membranes of the sinuses, mouth, and lungs.
- **Ingestion**: Ingestion of hazardous substances can occur by eating and drinking food that has been contaminated or more directly through oral contact with hands or tools used in art projects. Biting your fingernails, pointing brush tips with your lips or eating and drinking while working dramatically increases your exposure to toxic substances.
- **Injection**: The use of pressurized air to spray dusts or paint pigments can transport substances through your skin, and disperse the material into the air.

Types of Effects/Response Classes

- **Acute Effects**: Occur when a toxic substance provokes a response after a single, brief exposure.
- **Chronic Effects**: Take place when a toxic substance builds up in the body during repeated or prolonged exposures. These insidious effects may take weeks, months, or years to show up, and are often irreversible.
- **Local Effects**: Limited to the point of first contact with a chemical or substance causing toxic or irritation effects.
- **Systemic effects:** Result when a toxic substance passes through the point of original contact and causes "system-wide" harm to other organs of the body.

2.5 Reporting

If you have any accidents, notice any potential hazards, or experience any health-related problems that you suspect are caused by your exposure to art materials and/or techniques Then please...

- Report the incident to your instructor
- Contact the Health & Counseling Center (503-777-7281), or see your personal physician.

2.6 Self Protection for Artists

Face and eye protection:

These should be worn if there is a chance of splashes or flying debris from your project.

*Note: Normal eyeglasses and sunglasses do NOT count as safety goggles!

Protective clothing:

Shoes: Closed-toed shoes are required.
Clothes: Wear appropriate protective clothing. Cotton fabrics tend to trap dust. Some synthetic fabrics are extremely dangerous when ignited or exposed to high heat. Wash contaminated studio clothing separately from “street clothes.”
Glove: Toxic substances enter your body most frequently through skin contact. Gloves can minimize this hazard. We recommend you wear gloves when working with certain art materials. Make sure your gloves are of appropriate material for the hazards you are facing.

Respirators:

Wear a well-fitted and appropriate respirator when necessary. A dust mask filters out only particulate matter, while a respirator fitted with gas or vapor cartridges removes gas or vapors from the ambient air if you replace filters and cartridges regularly. Respirators should not be shared. When not in use, clean and store your respirator away from contaminated areas (storage in a large ziplock bag works well). Even disposable dust masks need to be stored properly and discarded after use. Respirators may not be worn if you have facial hair. Even a small beard can dramatically impair the proper fit (and the efficacy) of a standard respirator or dust mask.

Hearing Protection:

If the noise level in your environment requires you to raise your voice to be heard by someone nearby, you should wear hearing protection. Both earplugs and protective earmuffs are available. Be sure to protect yourself not only from the noise produced by tools you personally are working with, but also from the noise of those working around you. Because the ratings on both ear muffs and plugs can be confusing, call the Environmental Health and Safety Office (EHS) at 503-777-7788 to be sure you wear the right ones. Hearing protection is required in the wood shop.

Storage:

Personal protective equipment, including eye protection, face shields, hearing protection, gloves, and respirators, needs to be stored in a clean and sanitary manner.

3.0 Chemicals

3.1 Labeling of Chemicals and Art Media

You must label all containers regardless of whether their contents are new, used, or waste; this includes spray bottles that contain only water. A simple self-adhesive label, or even tape,

written on with a felt tip pen or marker, is all that is necessary. Make sure that the label is legible.

- The label must have the name of the container's contents (i.e. “mineral spirits”, “used developer”, etc.), and no abbreviations should be used.
- The warning(s) can be a word, picture, symbol, or any other means of indicating that the material in the container is hazardous.
- Identify each hazard associated with the material (i.e. “toxic,” “flammable,” “corrosive,” and/or “incompatible”).
- List the precautions that must be followed during handling, use, or storage to avoid harmful exposure to the material.
- Date product was first used.
- Name of person responsible for container.

Refer to Appendix 2: Communicating Chemical Hazards for more information.

3.2 Storage of Chemicals & Art Media

Label all containers, clearly listing their contents and special hazards. Store hazardous materials in non-breakable containers at all times. Use metal or plastic containers, not glass. Do not use soda bottles, milk cartons, or other food containers. Do not store large containers on high shelves where they might fall and break. Do not store chemicals that might react with each other in the same area.

3.3 Disposal of Chemicals & Art Media

It is a federal law that whoever produces hazardous wastes is responsible for that waste until it is properly disposed of, for example by incineration, reuse or recycling. Make sure you clean up well after you work. Do not leave chemicals in trays or spills on or in your workspace. Collect waste chemicals in containers clearly labeled with the name of the chemical or product (e.g. “Contains Waste D-76”). Do not collect waste in unlabeled containers. Do not mix wastes of different types or sources. You can get containers for waste chemicals from Environmental Health and Safety. Keep waste containers closed at all times. Contact Environmental Health & Safety to remove full waste containers and assist you with collection procedures. Chemical waste labels can be found on reed.edu/ehs.

3.4 Found Objects

PLEASE DO NOT BRING NON-APPROVED ART MEDIA OR CHEMICALS ON CAMPUS. Examples include spray paints, house paints (interior or exterior latex and enamel), and other found objects. Many are extremely hazardous and their disposal can be very expensive. Consult with your faculty or the Studio Art Technical Director if you want to use recycled wood. Please do not bring potentially dangerous materials to class. Examples of restricted items include old bike parts, computer parts, painted woods and metals, and plastics. Please check with your instructor before bringing any item into the classroom.

If raw materials are desired from the natural landscape of the campus or canyon: approval of such needs to be submitted to the Grounds Manager prior to collection. A proper proposal needs to include a short description of the project scope, desired location, a diagram showing dimensions, materials requested if using campus resources, and set-up and take down dates.

If you really need to use a particular product,

- Get it approved by your instructor.
- Add the SDS sheet for the product to the Reed College VelocityEHS SDS Library. SDS submissions will be approved by Environmental Health & Safety.
- Label materials with your name and date that are brought onto campus-be sure not to obscure safety or identification information on the container. Keep materials in their original containers whenever possible– do NOT use old food containers to repackage any hazardous materials!

3.5 Solvents

Usually used for cleaning or for mixing, common solvents include water, alcohol, acetone, paint thinner, lacquer thinner, and turpentine. Because they evaporate quickly, solvents are easily inhaled. You may stop noticing the odor of many solvents after just a few minutes of exposure. Listen to people who enter the studio and comment on the smell of solvents. You can also absorb them through healthy, unbroken skin. A solvent's volatility affects its flammability. For example, some solvent vapors can travel far from the source. If these find an ignition source, they can start a fire. Others can spontaneously combust solvent-soaked rags.

Precautions:

- Start by using the safest solvent available for the job. Read the Safety Data Sheet (SDS) and note the permissible exposure limit (PEL), which is an OSHA measurement of how much solvent can be used without adverse health effects.
- Familiarize yourself with the possible side effects that can result from long-and short-term exposure to the solvents you use.
- Do not use solvents to wash your hands. Baby oil may be used safely to remove oil-based media from the hands, followed by soap and water.
- Do not paint directly with your fingers–if you do get paint on your hands, be sure to clean under your nails when finished.
- Use the smallest amount of solvent that will get the job done.
- Do not store solvents near a heat source. Note the flash point on the label and check the SDS to determine a safe storage location.
- Use solvent-resistant gloves, aprons, or goggles to prevent contact. ALWAYS wear goggles when pouring a liquid.
- Good ventilation is the key to safe solvent use.
- Do not eat or drink while using solvents. Direct ingestion can be immediately hazardous to your health. For example, ingestion of turpentine or mineral spirits can be fatal.
- Always make sure containers are clearly marked with the contents and hazards.

- Label and carefully store waste solvent and paint sludge as hazardous wastes. To protect the watershed, never wash leftover paints, solvents, solutions, toxic chemicals, or other artistic mediums down the drain.
- Use water as the preferred universal solvent for non-oil based media.
- Always use rags instead of paper towels for regular cleanup.

3.6 Oil/Solvent Soaked Rags

Rags that you have been used for cleanup can self-ignite if not properly contained. Thus, you must never discard rags used with flammable liquids into trash cans; this poses a high fire risk.

Precautions:

- Never store oily/solvent-soaked rags near a heat source.
- Remove as much solvent as possible before discarding rags.
- Use the dedicated red self-closing fire hazard can in the painting room for storing rags.
- Do not wash rags in home or commercial self-service laundries. Wash water contaminants from paint, solvent, or oil must be pretreated before it goes to a sewage treatment plant.
- Locate a cleaning service that is willing to work with solvent contaminated materials if you want to reuse your rags.
- Contact Environmental Health & Safety (ehs@reed.edu) for recommended disposal options.

3.7 Aerosol Sprays

Precautions:

- Can produce fine mists containing possibly toxic materials that can travel long distances or may be suspended in air for extended periods before settling.
- Have the potential for inhalation of active ingredients and propellant.
- Contain propellants that are commonly flammable or toxic.
- Have many active ingredients that are toxic. These may be skin, eye, respiratory, CNS, liver, urinary, or reproductive irritants.
- Some aerosol containers are considered hazardous waste. Check the safety information on the product or the Safety Data Sheet (SDS).
- High-powered spray devices can actually inject particles of your media under the skin in some circumstances, introducing the chemical directly into your bloodstream.

To protect yourself from these hazards:

- Always spray outdoors. Proper ventilation must be available to prevent exposure. Never breathe the vapors. Direct the spray away from other people's breathing space.
- Do not spray with pigments that are known human carcinogens, such as lead chromate or zinc chromate.

- Use liquid paints whenever possible.
- It is generally best to use the safest product that will get the job done.
- Keep all aerosol containers away from open flames, sunlight, heaters, and other possible sources of heat. Do not smoke in areas where aerosols are being used.
- Never spray paints or solvents onto your skin. Some liquids in aerosol containers may burn you or cause a skin rash.
- Store unused, or partially used, spray cans in a paint storage cabinet.
- Contact Environmental Health & Safety for proper disposal.

3.8 Varnishes, Lacquers, and Resins

Varnishes and lacquers are solutions of natural or synthetic resins dissolved in volatile solvents. Turpentine, mineral spirits, and methyl alcohol are moderately toxic by skin contact or inhalation and highly toxic by ingestion. Turpentine can cause allergic reactions. Methyl alcohol affects the nervous system and can cause blindness. Most of these products are also extremely flammable! Keep them away from any ignition sources.

3.9 Pigments

Make a habit of reading the ingredients (as well as the SDSs) of your paints/pigmented media. The Color Index is a standardized shorthand system of color naming that is far more reliable and informative than the manufacturer's marketing name. For example, Venetian red, Indian red, and English red are all actually identical pigments- all three colors are designated PR101. The first letter is usually a "P" to denote a pigment; occasionally it may be "N" for natural pigment or "D" for dye. The next letter(s) indicate the general color group: "R" for reds, "O" for oranges, "Y" for yellows, "G" for greens, "B" for blues, "V" for violets, "Br" for browns, "W" for whites, "Bk" for blacks, and "M" for metallics. Following these letters will be an assigned number, which indicates where that particular color lies on a standard list of pigments in that color group.

If possible, limit your selection to media that feature the Color Index names on the labels–this will make it much easier to ascertain what pigments are in your materials. Convenience mixtures contain blends of two or more pigments, but the proportions of the mixture depend on the manufacturer. Additionally, colors referred to as “hues” usually contain only small amounts of the pigment in question (if any), and are therefore safer than their more traditional full-strength counterparts.

Powdered pigments present a major inhalation hazard, while liquid or solid pigmented media can present an ingestion or skin absorption hazard. Choose premixed liquids over powders that require mixing whenever possible, wear gloves when working with any known toxin or substance that you are sensitive to, and wear a dust mask or work in a hood to minimize pigment inhalation when working with powdered pigments.

Precautions:

- If you are pregnant, nursing, or work extensively with young children, consider limiting your palette to well-tested non-toxic pigments.
- Minimize skin contact. Latex gloves reduce contact and possible absorption of paint, inks, and solvents. No single kind of glove is appropriate for all hazards. Consult your instructor to ascertain which kind of glove is best suited to your work. Should contact occur, wash up immediately.
- Before leaving the studio, wash your hands! Oil-based media can be safely removed from skin by using baby oil or vegetable oil before washing; do NOT wash hands with solvents! Make sure to wash under fingernails as well—nail biting can lead to accidental ingestion.
- NEVER put your paintbrush (or any other tool) in your mouth.
- Using pre-mixed liquid media is much safer than grinding and mixing powdered pigments.
- Avoid paint spraying, sanding, or grinding whenever possible, if need to go outside and wear a mask
- Do not eat, drink, or apply cosmetics or lip balm in work areas.
- Never smoke without first washing your hands and face.
- Do not wash paints and inks down the drain.
- Before washing brushes, rollers, or palette knives, wipe excess paint or ink onto a rag.
- All materials containing heavy metals are considered hazardous waste. Contact Environmental Health & Safety for disposal information.

4.0 Considerations for Thesis Projects

4.1 Guidelines for Individual Studios

- Food and drink must be kept clearly separate from art materials. There is to be no eating and drinking in the studios. Eating is fine within the lounge sections.
- Solvent, flammable, and corrosive material containers are to be kept covered at all times and stored in cabinets or lockers when not in use.
- All waste solvents and other waste chemicals are to be poured into the disposal jugs provided by the College. Do not pour chemicals down the drain!
- Throw away oily rags in the special flammable-rag disposal containers provided.
- Do not mix incompatible chemical wastes.
- Do not mix chemical waste with trash.
- Keep the floor free of clutter. All electrical wires must be secured and kept out of high traffic areas, so they are not a tripping hazard. Furthermore, some of the studio walls on the south side of the building leak in heavy rain, and anything left on the floor, including electrical wires and books, is at risk.
- Do not store overflow materials, supplies, art, etc. in the hall or lounge.

- Do not attempt any activity for which there is not adequate ventilation in your studio.
- Do not leave the front door or the door at the end of the hall propped open. This potentially endangers not only you but other students working in the building.
- Although studio light switches override the building on/off system, the hall, restrooms, and downstairs lights are off between 1 – 6 am. If you need those lights back on, control panels are located by the upstairs front door or by the downstairs sculpture exit door.

4.2 Additional Safety Considerations

- Approval is required if you wish to set up any project within the Canyon. To ask for permission, contact Grounds.
- Do not drape materials in a way that covers the ceiling, as this will block the fire sprinklers.
- Do not hang anything from the fire sprinkler lines.
- Limit the number of flammable materials hung from the wall. Flammable materials such as plastic bags, paper products, and paintings may not cover more than 20% of a wall surface.
- Sleeping is not allowed in non-dorm buildings.

5.0 Ergonomic Hazards

5.1 Ergonomics

To help avoid injury keep your posture in mind, both while standing and sitting.

- While standing, try to keep your head, shoulders, and pelvis vertically aligned.
- Keep your abdominal muscles tightened and your hips in line with your body, and your feet apart with your knees slightly bent.
- Prolonged static posture is the enemy. Try changing positions while working, and take frequent breaks to walk around or stretch. Make sure you shift positions at least every 20 minutes. When returning to your task, make a concentrated effort to use an alternate posture for a few minutes. For example, try changing which foot your weight is resting on every 20 minutes to stay comfortable while working.
- If you are standing on a concrete floor, wear well-cushioned shoes, add a rubber mat, or work with one foot resting on a raised surface to help prevent discomfort.
- When seated, try to make your workstation fit your body. Adjust your seat so that your working surface is at elbow height, and try to keep your knees slightly lower than your hips. If you're working with a computer, try raising your screen so that the top-most line on the screen is at eye level–you can prevent neck pains by eliminating the need to bend your head while working.
- Fatigue makes you move awkwardly. If you are exhausted or feel unwell, get someone to help you rather than trying to do something alone.

5.2 Lifting

Objects that may present a lifting hazard include:

- Heavy objects (over 20 lbs. if they will be lifted repeatedly; or over 50 lbs. at one time).
- Bulky or awkward objects.
- Loads whose weight may suddenly shift.
- Objects that must be lifted from above shoulder level.
- Objects that must be lifted from the floor.
- Objects that cannot be held close to the body.
- Objects stored where there is not enough space to lift them safely, without reaching or twisting.

When lifting heavy objects, remember these rules:

- Avoid lifting objects that are on the floor or above your head–especially if they are heavy.
- Split up large loads into smaller ones to reduce weight.
- Get help!
- Use a cart or dolly to assist you. If the load requires pulling, keep the cart by your side to avoid twisting your lower back.
- When dealing with very heavy wheeled loads, turning around and pushing with your legs while bracing your back against the object can be helpful and may minimize the danger of back injury.
- If dealing with multiple objects of approximately the same (small) size, carry one in each hand to balance the load.
- Use proper lifting technique:
    - Stand close to whatever you are lifting. Never reach over for a heavy item.
    - Place feet on both sides of the heavy item
    - Bend your knees, and not your back. Squat down. This may be hard on your knees, but it is a tradeoff.
    - Lift with a straight back, while bending and straightening the legs.
- Carry the load close to your center of gravity. Hold the item securely, close to your torso, and lift with your legs instead of your back.
- Choose pivoting over twisting when moving objects. Twisting puts a strain on the mid-torso and lower back, while pivoting keeps the shoulders, hips, and feet in line and the load remains in front of you at all times.
- Remember, do not lift more than you can lift comfortably–get help if you need it.

5.3 Vibration

Hazards associated with vibration:

- Restriction of blood supply to the hands and fingers.
- Occasional numbness or loss of color in the fingertips. This can progress to more frequent and persistent symptoms affecting a larger area of the fingers and resulting in reduction in sensitivity and manual dexterity, as in Reynaud's phenomenon.

- The exposure time necessary to produce symptoms may range from one month to 30 years, depending on the intensity of the vibration source, the transmissibility and absorption of vibration to the hand, and individual susceptibility.
- Bones and muscles may also become damaged by repeated or prolonged exposure to vibrations.

To reduce the effects of vibration:

- Use low-vibration tools.
- Wear anti-vibration gloves or use vibration dampeners.
- Take frequent breaks.
- Alternate your tasks.

5.4 Repetitive Motion

Whenever you repeat the same hand movement for a long period of time, you run the risk of repetitive motion injuries. Extended computer work, drawing, painting, sanding, weaving, and many other processes may put an individual at risk for a repetitive motion injury (RMI).

To prevent RMIs:

- Perform 5 minutes of alternative work activity for every 30 minutes of continuous, high intensity, repetitive work.
- Use neutral postures when working.
- Take frequent breaks and stretch your muscles.
- Vary your activities/motions.

6.0 Blood-borne Pathogens

Exposure to blood-borne pathogens may occur during the removal of foreign objects from the eyes or skin, treatment of cuts or scrapes, cleaning up blood, contaminated blades, chisels, needles, pins, etc. Some artists may choose to work with bodily fluids or animal remains/byproducts in their art. The following rules should be adhered to during work and cleanup to ensure the safety of everyone involved:

1. Protect yourself:
    a. Treat all blood and body fluids as potentially infectious.
    b. Wear gloves and splash masks when cleaning up blood and other bodily fluids.
    c. Wash hands with antibacterial soap after contact.
    d. If eye contact occurs, flush eyes and face with copious amounts of water.
2. Waste disposal:
    a. Waste and contaminated sharps shall be cleaned up immediately or as soon as possible, and placed in biohazard containers. Environmental Health & Safety can provide both puncture proof sharps containers and red biohazard waste bags.
    b. Contaminated materials shall not be picked up directly with your hands. Wear impermeable protective gloves (latex, or if allergic to latex, nitrile or

polyurethane) and dispose of them in the biohazard bag as well after clean up is complete.

3. Report accidents/exposure incidents to the Human Resources.

7.0 Media Specific Hazards

7.1 Painting and Drawing

Two-dimensional art has been part of human history for many thousands of years. Ancient rock painting imagery has been discovered in Australia from as long ago as 40,000 B.C., and may well have existed even earlier. More sophisticated processes in paint and pencil production and use were not common until much later. This section is intended to bring to light other specific hazards and precautions that are applicable to the various forms of wet and dry media themselves.

General Paint Studio Safety:

See General Introduction (p 7)
See Solvents (p 13-15)
See Aerosol Sprays (p 15)
See Pigments (p 15-17)

Acrylic and Oil Paints:

Possible throat irritation from acrylic paints and gel medium can occur from small amounts of ammonia and formaldehyde in paints and media. Many oil paints are toxic by ingestion and harmful to the environment, see Pigments precautions (p 15-17).

Pastels, Chalks, Graphite and Charcoal:

Many pastels can contain toxic pigments, including chromium, cadmium, and manganese. Blowing off excess pastel dust increases dust inhalation. Graphite or charcoal dusts may be carcinogenic if inhaled. Many pastels are poorly labeled for content. Avoid pigments containing lead chromate and other toxic pigments. Instead of blowing off excess dust, tap your drawing to remove accumulated dust. Use the hood for this, or wear a NIOSH-approved dust mask. Wet mop or vacuum instead of sweeping up dust. Spray fixatives only outside.

Markers/Ink:

Inks often contain solvents as well as preservatives. Solvent-based permanent markers may pose an inhalation hazard without proper ventilation; those containing toluene are particularly hazardous.Try to choose water or alcohol based markers over other solvent-based ones, work in a properly ventilated area, and obtain SDSs on all inks so that you know their potential hazards. If you do use solvent-based markers or inks, look at the solvents section (p 13-15).

Water-based Painting:

Watercolors and acrylics can be among the safest artistic materials you may use. Recent innovations in paint production have also allowed for the development of water-based oil colors; these paints have the same pigments and qualities as traditional oil paints, but they may be thinned and cleaned up with water. These are a good alternative to those individuals with solvent sensitivities or respiratory difficulties, although the pigments are still hazardous.

Some acrylic paints contain small amounts of ammonia or formaldehyde as preservatives. Many water-based paints contain the same heavy metal pigments used in oil paints. Gum binders in watercolors can cause skin allergies. Spraying watercolor paints can cause asthma if inhaled.

7.2 Photography

General Darkroom Safety:

Take breaks and be aware of ventilation problems—prolonged exposure to photographic chemicals can lead to chronic health problems. Make sure to never put your hands into photographic chemicals. Cleanup all spills immediately to prevent slipping and falling and reduce inhalation of chemicals.

General Precautions:

- Use tongs and/or rubber gloves, protective clothing, and eye protection while working with chemicals in the darkroom.
- Process and mix in a well-ventilated room with an exhaust fan. Ten to twenty room exchanges per hour will help minimize inhalation hazards.
- Avoid using powders; use pre-mixed liquids whenever possible. If you have to use powdered chemicals, wear a dust mask.
- Have close access to running water in case of spills and eye or skin contact with darkroom chemicals. Know where the nearest eyewash is located.
- Label and date all containers clearly. Do not use milk or juice containers for chemical storage.
- Do not eat or drink in the darkroom; hand to mouth and eye contamination are more likely to occur. Dust and powders can easily contaminate food and drink.
- Never smoke without first washing your hands and face—smoking with residual darkroom chemicals on your hand can cause inadvertent inhalation.
- Wear aprons or other protective clothing and leave them in the darkroom. Wash all protective clothing frequently and separately from street clothes.
- If you wear contact lenses, you should also wear splash-resistant goggles.
- Keep a spill kit in the darkroom.

Disposal of Darkroom Chemicals:

- Make sure you clean up well after you work. Do not leave chemicals in trays or spills in your workspace– spills release gasses as they evaporate and may react with oxygen in the air.
- Collect photo solutions in separate containers, and clearly identify their contents (e.g., “Contains D-76 Waste"). Never mix wastes of different types or sources. You can obtain waste containers from Environmental Health & Safety.
- Keep waste containers closed at all times.
- Contact Environmental Health & Safety to remove full waste containers.

7.3 Ceramics

Dust:

Almost all clay, clay mixtures, and many glazes contain silica, as well as asbestos (in mica), dioxin, and a variety of other hazardous ingredients. Use local exhaust ventilation when working with powdered materials. Wear gloves when touching any raw materials, dry or wet. Wear aprons or other protective clothing and leave them in the studio. Wash all studio clothing frequently and separately from street clothes. If you must work with dry pottery chemicals, you need to contact Environmental Health & Safety for proper personal protective equipment recommendations and training. If possible, change into washable designated work clothes before potting or glazing, and then back into clean clothing before leaving the studio. Clean up spilt clay, slip and water, and other materials immediately. Wet mop your work area (NEVER sweep clay dusts) and wipe down surfaces with a wet sponge. Break open molds under water. Do not eat, drink, or apply lip balm or cosmetics in areas where there is dust containing crystalline silica. Never smoke without first washing your hands and face—silica dust in combination with smoking is particularly dangerous. Keep the machine guards of the mixing apparatus in place. Transfer powdered chemicals with scoops or spoons–dumping powders creates dust in the air. Glazes should not be poured down the drain or disposed of in the trash. Talk to the ceramics instructor or contact Environmental Health & Safety for proper disposal information.

Molds in Clays and Glazes:

Wash your hands and change your clothes after working with clay. Wear respiratory protection when working with moldy clay. Gloves may help when handling wet clay.

Throwing:

Work off of the wheel whenever possible–do your work standing when away from the wheel. Break up the day into varied tasks consisting of standing, sitting, light work, and heavy work. Performing simple exercises during the working day will prevent tension, fatigue, and stress.

Kiln Emissions:

Fire in a well-ventilated area and be aware of possible exposure to kiln emissions. Always wash hands after working in an area that may be contaminated with toxic metal dust from firing. When raku firing, always wear an appropriate respirator, protective clothing, and gloves.

Infrared & Ultraviolet Radiation:

During kiln firing, both infrared and ultraviolet radiation are released. Cumulative effects may cause cataracts. Staring into a kiln to see the cones may damage your eyes. Use proper eye protection. Make sure that you get eyewear that will protect you for ranges of 800-6,000 nanometers, and even higher if possible. Welding lenses with a shade number 3 or 4 work well.

Electrical Cords within the Ceramics Studio:

All electrical cords are required to have a built-in ground fault circuit interrupter (GFCI). If a circuit trips, reduce the electrical load and reset ONCE. If a circuit repeatedly trips, contact Physical Plant (503-777-7283); the circuit may have a short that could start a fire.

7.4 Printmaking

Etching Grounds:

Make sure to treat etching grounds as solvents. Store them with solvents in safety cans and use exhaust ventilation. Use the lowest temperature on hot plates to avoid vaporization of polycyclic aromatic hydrocarbons (PAHs).

Rosin and Asphaltum:

Only work in a well-ventilated area. Vacuum or wet mop any spilled dust or powder–do NOT sweep. Ask your instructor about alternatives if you have an allergic reaction.

Hot Plates:

Heating grounds and inks on a hot plate create fumes that can be extremely toxic. Do not touch a hot plate when it is on. Remember to turn it off when not in use.

Printing Press:

Avoid lifting heavy machinery parts unless absolutely necessary. If they must be moved, lift carefully (following ergonomic lifting principles- see page 17) and get help! Wear sturdy, closed-toed shoes at all times. Do not wear loose clothing or dangling jewelry while working, and be sure to tie back long hair securely. Wash hands thoroughly after handling type blocks, especially before smoking or eating.

Corrosive Materials:

Corrosive materials are hazardous because they burn, irritate, or damage tissue on contact. Highly concentrated corrosive materials, such as the etching solutions used in printmaking, can cause severe, permanent injury to skin, tissue, and eyes. Corrosives also give off vapors, which, if inhaled, can damage respiratory tissue and mucous membranes.

Use care when working with any caustic chemical. When diluting acids, add acid to water, NOT the reverse. Pouring water into concentrated acid causes a violent reaction involving spattering, splashing, and sudden buildup of heat. Use concentrated corrosive materials only in well-ventilated areas. Be aware of incompatibilities: some corrosives are oxidizers and will react with solvents. If you are unsure of a product's reactivity, refer to the SDS of your product. Corrosive materials will quickly penetrate most clothing materials and injure your skin. If you accidentally splash some on yourself, remove any affected clothing, and rinse the skin liberally for at least fifteen minutes, followed immediately by medical attention from a doctor or nurse. Trays in the acid hoods must be kept covered to reduce evaporation and prevent unnecessary exposure to fumes. Never dispose of toxic or corrosive materials down the drain. For information on the clean up of a toxic or corrosive spill, contact Environmental Health & Safety. Never store any material that you are not prepared to control or clean up if it spills.

Ink/Pigments:

DO NOT use solvents to remove ink stains from skin! If staining remains after thorough washing, allow it to wear off the skin's surface naturally. Wash work surfaces thoroughly after use. See pages 13 through 15 for more information on Pigments.

Anti-Skinning Agents:

The chemicals in aerosol anti-skinning products may be highly toxic via inhalation. Aerosol preparations are also often highly flammable. Try to Keep away from ignition sources. Use only in a well ventilated area and avoid inhalation. Consider substituting a different substance–eugenol (oil of cloves) is a somewhat less toxic anti-skinning option.

Waste Chemicals:

Clean printing plates and equipment with the smallest amount of solvent necessary. Collect old cleaning solutions and waste chemicals in containers clearly labeled with the name of the product (e.g., "contains turpenoid waste"); do not collect waste in an unlabeled container. Do not mix wastes of different types or sources. Keep waste containers closed at all times. Contact Environmental Health & Safety to remove full waste containers and assist you with collection procedures.

7.5 Sculpture

Welding, Brazing, & Plasma Cutting:

Metal work, like all other artistic processes, has many variations in technique, as well as in the associated hazards. The Reed art department has equipment for oxy-acetylene welding (and cutting), arc welding, metal-inert gas welding, and plasma cutting. These are advanced techniques requiring training and careful use to promote a safe working environment for you and your fellow artists. Consult your instructor if you want to pursue metalwork as part of a project.

Welding Procedures:

MIG (Metal Inert Gas) set up

- Plug in MIG.
- Attach ground to table or work.
- Check that the regulator handle feels loose (turn to left until it feels loose if it doesn't).
- Crack the cylinder slowly and then open all the way.
- Turn the regulator handle to the right until the flow gauge (on left) reads 12 lpm (red numbers on the inside).

MIG (Metal Inert Gas) break down

- Turn the cylinder off.
- Pulse triggers slowly until BOTH gauges drop back to zero.
- Turn off the machine.
- Back off the regulator handle until it feels loose.
- Unplug, unclamp, and put away.

Oxygen / Acetylene:

To set up: ensure the torch valves are closed, crack cylinders gently…leave the acetylene valve cracked open, open oxygen all the way, set pressure on both tanks to 5 using the numbers on the inside of the gauge and then soap test all threaded connections.

To break down: turn off cylinders, bleed lines by opening torch valves until both gauges on both cylinders drop down to zero, close valves, back off gauge handles (turn to the left) until they feel loose and then put away.

Plasma cutter:

- Plug in plasma cutter to dedicated 220 outlet under new panel on kiln shed wall
- Attach compressed air hose to rear of plasma cutter
- Turn on compressor switch in middle of compressor
- Turn on the machine when ready to cut…. You should have two solid green lights*. On switch is the one furthest to the left. Middle switch changes the machine from run mode to air pressure set mode (in this setting the compressed air runs continuously). Make sure it is in run mode. Attach ground to table or work.

* If the green voltage light is blinking, turn off the machine and wait a few minutes, then try again. Reverse process to put the machine away. Make sure the compressor is turned off. Drain compressor.

Heavy Metal Fumes:

Exposure to welding fumes can result in metal fume fever. This condition resembles influenza and is characterized by fever, chills, headache, nausea, shortness of breath, muscle pain, and a metallic taste in the mouth. Smoking with metal oxides and solvents on your hands is particularly harmful to your health.

Precautions:

- Know your materials.
- Only mild steel should be used. Use of stainless steel or high chromium steels requires mandatory air monitoring for hexavalent chromium, a known carcinogen.
- Read warning labels and instructions on filler metals and fluxes.
- Work in well-ventilated areas, or wear an appropriate respirator. Use the portable dust/fume extractor for welding. Never weld in a confined workspace- always weld outside.
- Do not overheat metals.
- Wear eye/face protection and protective clothing.
- Wash hands thoroughly after handling fluxes and metals. Wash hands carefully with soap and water after each class, before eating, and during breaks. Never use a solvent to clean hands.
- Never smoke without first washing your hands.
- Leave all food and drink outside the sculpture studio.
- Do not weld or plasma cut any metal that has paint, rust or any other coating or residue on it.

Preventing Fire Hazards:

Move all objects that could ignite, combust, or explode away from the object being welded or cut. Use welding curtains to shield the arc from others. Fire extinguishers are required in welding and cutting areas. Do not leave hot steel unattended; use Quench Buckets. Work in a well-ventilated area with an appropriate respirator. Wear welding gloves, hood, and coat or apron. If you have any doubts about the equipment, ask the shop technician for assistance.

Hot, sharp surfaces:

Handle heated or sharp pieces of metal with extreme caution–be aware of those around you as well! Do not leave hot steel unattended; use Quench Buckets. Wear appropriate PPE–heavy gloves and boots.

UV & Infrared Radiation from Welding and Cutting:

Skin exposure to ultraviolet (UV) radiation can result in severe burns. UV radiation can also damage the lens of the eye. Exposure to infrared radiation (IR) may heat the skin surface and the tissues immediately below the surface. At no time should the arc be observed without eye protection–this goes for those working nearby as well as the person working the metal. Wear a welder's helmet/goggles and protective clothing. Most welders protect themselves from IR (and UV) with long-sleeved shirts (choose 100% wool or fire-retardant cotton, never synthetics, which could melt onto the skin) and a leather apron. Place a protective screen/curtain between the welding arc and others in the area.

Epoxy Resins/ Fiberglass:

Resins are highly flammable and are also suspected carcinogens. Dust resulting from cutting, shaping, or sanding resins or fiberglass is toxic via inhalation. Avoid dusts, skin contact, and inhalation of fumes. Keep resins away from ignition sources.

Hot Plates:

Do not touch the hot plate when it is on. Remember to turn it off when not in use. Use a well-ventilated area. Remove all combustibles (solvents, art media) from the immediate area.

Compressed Gasses:

All compressed gas cylinders must be labeled legibly with their contents. Gas cylinders must be stored in approved spaces and must be secured from falling. The control valves of cylinders not in use must be covered by their protective caps. Valves must be closed and protective valve caps in place before cylinders are moved. Wear appropriate foot protection when moving or transporting cylinders. Keep valves closed on empty cylinders. Cylinders must be kept away from sources of heat. Store and use with adequate ventilation. Cylinders must be kept away from electrical wiring where the cylinder could become part of the circuit. High-pressure spray can cause serious accidents due to accidental injection of the high-pressure spray into skin.

Compressed Air:

As with all compressed gas cylinders, store compressed air in a secured upright position in a safe location away from ignition sources and electrical wiring. Ensure that pressure reduction tips are used on the air nozzle. Do not use compressed air to clean up (or play with!). Vacuum or wet mop work surfaces, and wash work clothes rather than attempting to blast them clean.

Oxygen:

Oxygen cylinders should not be stored with cylinders of flammable gases or combustible materials unless separated by a distance of 20 feet or by a fire resistant partition at least 5 feet high.

Acetylene:

Acetylene cylinders must be kept in an upright position to prevent acetone (solvent used to dissolve the acetylene) from coming out with the gas.

Wood Dusts:

Some wood dust may cause nasal cancer or asthma. Western red cedar is a known sensitizer that causes allergies and asthma. Oak and beech are confirmed human carcinogens. Birch, mahogany, teak, and walnut are suspected human carcinogens. The glues in MDF and plywood can be hazardous. Some woods are toxic in and of themselves: hemlock is a classic example. Tropical hardwoods are also known for being common irritants/sensitizers, and are often problematic. Sawdust from green woods can be troublesome as well, because the presence of the sap in the wood may also increase the presence of potential allergens or irritants. Fine wood dust in the air can be extremely combustible and may explode.

Make sure to:

- Work in a well-ventilated area.
- Wear an appropriate respiratory mask that is well sealed around the face.
- Limit your work to softwoods, especially if you are asthmatic or have allergies.
- Wash your hands after handling all the wood. Wear gloves if necessary.

Wood Preservatives:

Many wood preservatives contain arsenic, chromates, or chlorinated phenols. Repeated exposure can cause chronic bronchitis, with symptoms such as cough and sputum (phlegm), shortness of breath, and chest discomfort. Long-term inhalation exposure can cause lung cancer. Short-term exposure may cause birth defects, as well as skin and respiratory reactions. It is important to keep food and cigarettes out of the work area and to wash your hands before eating or smoking if you are working with these or any other toxic substances. When handling and sawing wood, it is a good work practice to wear gloves made of an impermeable material, such as rubber. Wear an appropriate respiratory mask that is well sealed around the face.

Adhesives and Glues:

Do not open the container until you have found out what is in the product and what the hazards may be. You may find a list of ingredients, a safety warning, or both. All containers must be labeled. Read the Safety Data Sheet (SDS) for the product. SDSs are required by law, and everyone working on the site has a right to see them. Substitute less toxic glues and adhesives.

Noise:

Wear earplugs and/or earmuffs to reduce noise exposure. Hearing protection is required in the wood shop. Contact Environmental Health & Safety for information on ear protection and the proper use and care of this protection.

Plaster/ Calcined Gypsum:

Do not sweep–wet mop or vacuum only! Wear appropriate PPE–mask, gloves, and goggles if you will be chipping or carving the set plaster.

Appendix 1: Glossary of Terms

Acute: Acute exposures and effects involve short-term high concentrations and immediate results of some kind (illness, irritation, or death). The effect of a chemical is considered acute when it appears with little time lag, such as within minutes or hours.

Dust: Airborne particles with weight and mass that are generally larger in size than the particles in fumes. Dust particles within a respirable size (1-10 microns) represent a health problem via inhalation. Dust cannot be seen by the naked eye, but may be visible when viewed through rays of light. Dust can be generated by handling, crushing, grinding, rapid impact, detonation, and breakdown of certain organic or inorganic materials (especially rocks, metal, wood and fibers). Dust is different from vapors and mists—it is composed of solid particles, each of which consists of a large number of atoms or molecules of a material that is not normally volatile.

Ergonomic Hazards: Workplace conditions that place workers at increased risk of developing a musculoskeletal injury or which otherwise increase the likelihood of other work performance problems. Some examples of ergonomic hazards are lifting or extended work in one position (drawing, computer work, etc.)

Flash Point: Lowest temperature at which the vapor of a liquid or solid ignites when in contact with sparks, flames, or other ignition source.

Hazard: A situation or chemical that may present the potential for harm.

Health Hazard: Pertains to a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.

Hazardous Substances: Any substance which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions or physiological deformations in such persons or their offspring. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive.

Health Risk Assessment: A document that identifies the risks and quantities of possible adverse health effects that may result from exposure to emissions of toxic air contaminants. A health risk assessment cannot predict specific health effects; it only describes the increased possibility of adverse health effects based on the best scientific information available.

Safety Data Sheets (SDS): A SDS contains information on the hazards associated with a chemical or product, and gives information on its safe use. SDS are available and should be read before use of any new materials. Previously these were called **Material Safety Data Sheets (MSDS)**.

National Institute of Occupational Safety and Health (NIOSH): The federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness. NIOSH is part of the Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services.

PPE: (Personal Protective Equipment) refers to whatever protective equipment may be used to insulate an individual from the chemical, thermal, explosive or other hazards presented by the environment in which he or she is working, i.e. safety glasses, laboratory coat, protective shoes, chemical-resistant gloves, etc.

Risk: Is the probability or chance that the hazard posed by the chemical or situation will lead to injury.

Risk Assessment: A process that estimates the likelihood that exposed people may have health effects.

- Hazard Identification: Can this substance damage health?
- Dose-response Assessment: What dose causes what effect?
- Exposure Assessment: How and how often do people contact the substance?

Risk Factors: something that puts an individual at a greater risk, specifically for diseases or infections. Below are some of the most common risk factors:

- Amount of exposure
- Length of exposure
- Multiple exposures
- Exposure conditions
- Toxicity
- Total body burden
- High-risk groups:
    - Smokers
    - People taking medications
    - People with allergies
    - People who have pre-existing medical conditions
    - Pregnant women

Appendix 2: Communicating Chemical Hazards

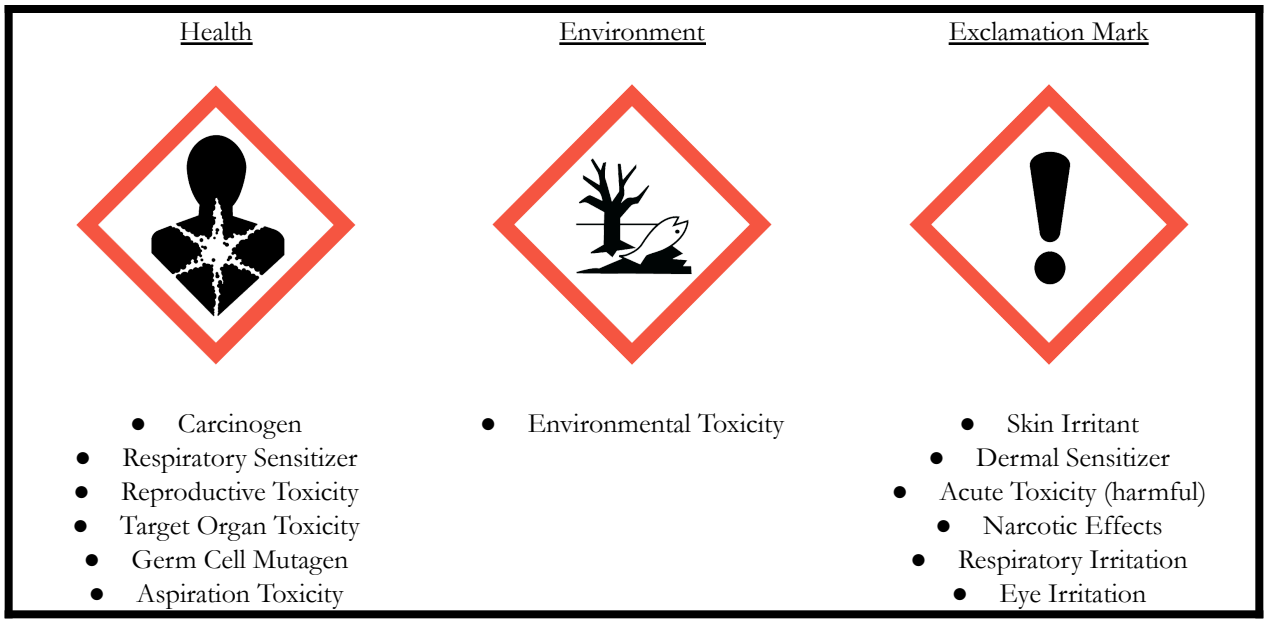
In 2012, the Occupational Safety and Health Administration (OSHA) updated the Hazard Communication Rule, 29 CFR 1910.1200. The changes standardize the content of safety data sheets (SDSs) and require the use of pictograms, signal words, and statements that identify hazards and precautions.

The SDS 16-Section: Format

- Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.
- Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.
- Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.
- Section 4, First-aid measures includes important symptoms/effects, acute, delayed; required treatment.
- Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.
- Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.
- Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities
- Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).
- Section 9, Physical and chemical properties lists the chemical's characteristics.
- Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.
- Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.
- Section 12, Ecological information
- Section 13, Disposal considerations
- Section 14, Transport information
- Section 15, Regulatory information
- Section 16, Other information, includes the date of preparation or last revision preparation or last revision.

Pictograms and Hazard Classes

Flame Over Circle	Flame	Exploding Bomb
		
• Oxidizers	• Flammables • Self Reactives • Pyrophorics • Self-Heating • Emits Flammable Gas • Organic Peroxides	• Explosives • Self Reactives • Organic Peroxides
Skull and Crossbones	**Corrosion**	**Gas Cylinder**
		
• Acute toxicity (severe)	• Corrosive to Metal • Skin Corrosion • Serious Eye Damage	• Gases Under Pressure • Liquefied Gas



Labels

All labels from manufacturers must have the following information:

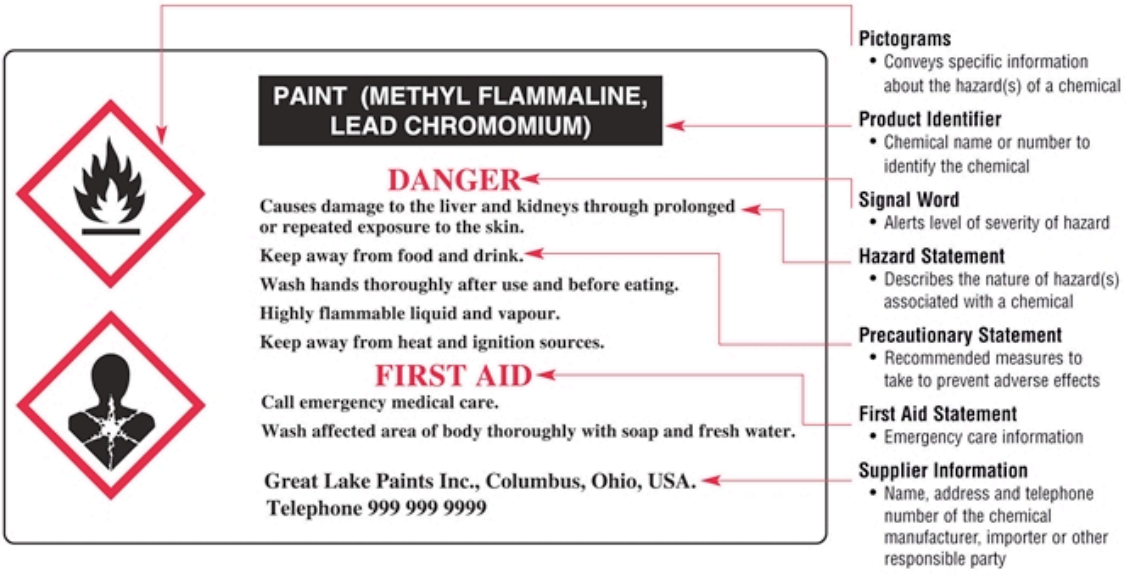
- pictograms,
- a signal word: either “danger” or “warning”
- hazard statements that describe the physical, health, and/or environmental hazards.
- precautionary statements that describe measures to minimize or prevent adverse effects.

There are four types:
Prevention - “Wash thoroughly after handling. Chemical manufacturer, importer, or distributor to specify parts of the body to be washed after handling. Do not eat, drink, or smoke when using this product.”
Response - “If swallowed: Immediately call a poison center/doctor Chemical manufacturer, importer, or distributor to specify the appropriate source of emergency medical advice. Specific treatment (see on this label) Reference to supplemental first aid instruction. - if immediate administration of antidote is required. Rinse mouth.”
Storage - “Store locked up.”
Disposal - “Dispose of contents or container to… in accordance with local, regional, national, international regulations (to be specified).”

For example, for a product identified as acutely toxic – oral, we would see the following:

- the product identifier
- supplier identification.

A sample label, identifying the required label elements, is shown below. Supplemental information can also be provided on the label as needed.


PAINT (METHYL FLAMMALINE, LEAD CHROMOMIUM)
DANGER
Causes damage to the liver and kidneys through prolonged or repeated exposure to the skin.
Keep away from food and drink.
Wash hands thoroughly after use and before eating.
Highly flammable liquid and vapour.
Keep away from heat and ignition sources.
FIRST AID
Call emergency medical care.
Wash affected area of body thoroughly with soap and fresh water.
Great Lake Paints Inc., Columbus, Ohio, USA.
Telephone 999 999 9999
Pictograms
• Conveys specific information about the hazard(s) of a chemical
Product Identifier
• Chemical name or number to identify the chemical
Signal Word
• Alerts level of severity of hazard
Hazard Statement
• Describes the nature of hazard(s) associated with a chemical
Precautionary Statement
• Recommended measures to take to prevent adverse effects
First Aid Statement
• Emergency care information
Supplier Information
• Name, address and telephone number of the chemical manufacturer, importer or other responsible party