

SCULPTURE

Introduction

We won't stop making art but we **can** stop making ourselves sick!

This kit was designed by artists to warn you of the dangers and give you some tips to improve your working conditions.

Here's to a long, healthy working life!

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PROTECT YOURSELF!

What are my art materials doing to me?

All art materials contain chemicals; many can harm or even kill you if they get into your body. You can breathe them in, absorb them through skin contact or swallow them accidentally if you eat, drink or smoke in the studio.

Inhalation (you're breathing it in)

Art materials produce dusts, gases, fumes and vapours which can damage your lungs. From there they can enter the bloodstream, depositing toxins in your organs and fat tissue. Damage is not always immediately obvious, it can happen over a period of time. By the time symptoms appear, the damage may be permanent.

Skin contact (you're soaking in it)

Your skin absorbs some chemicals, particularly solvents, and carries them into the bloodstream. Unprotected cuts and sores are an open doorway for chemicals to enter your body. Solvents, acids, alkalis and bleaches destroy the protective barriers in your skin, which can cause eczema, dermatitis and allergies and allow other chemicals to enter your body.

Ingestion (you're swallowing it)

Would you eat your art materials if they were served to you on a plate? You may as well if you eat, drink or smoke in your studio! Gases, vapours and dust settle on everything including food and drink. Unwashed hands contaminate whatever they touch too. If you swallow chemicals they can damage your mouth, throat, stomach, nervous system, liver and kidneys. Chemicals can make you seriously ill.

Other factors

The effect of chemicals on your body will be *worse* if you smoke, drink heavily, or suffer from allergies or chronic illness, eg asthma, epilepsy. You should take special care if you are pregnant.

Bad work conditions and chemical exposure can contribute to *stress-related* illness and weaken your resistance to disease.

So where's the proof?

Many artists are so used to feeling unwell that it makes it hard to identify the symptoms of chemical poisoning. Some of us don't register anything much until it's too late. You could be feeling the effects of chemical poisoning if you regularly suffer from:

- headaches, tiredness, dizziness or faintness, extreme mood swings (generally after leaving the studio)
- allergies
- skin irritations, rashes, spots
- aches and pains in joints and muscles
- breathing problems at night and during exercise (like walking up the stairs!)

Have you noticed that these symptoms are not as severe when you're away from the studio for more than a few days?

What about my art equipment?

Ergonomically speaking like they say, *it ain't what you do but the way that you do it* that counts. Dangerous work practices make it harder to function efficiently and can cause accidents. Backaches and muscle-strain injuries are often the result of working at benches and scaffolding that aren't adjusted to your height.

Overdoing it?

Working for long periods, particularly on repetitive tasks, can cause permanent injury to overused muscles and result in accidents.

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What's that you say?

Working regularly in a noisy environment, eg sculpturing with power tools, increases the risk of deafness, high blood pressure and stress.

What can I do about it?

Right Away You can clean up your act and that includes your studio! Pull up carpeting and lay down cheap linoleum or another non-absorbent surface that can be wet-mopped or vacuumed (sweeping stirs up dust).

Organize your studio so that everything has a place including separate storage for dangerous chemicals. Store your materials in suitable containers (refer to Material Safety Data Sheet on the product). Label your materials clearly.

Set your benches and chairs to a good working height, see Diagram 1. Use an adjustable overhead lamp, eg daylight, colour corrected tube.

Breathe Easy You need air in your studio- if you can't afford exhaust ventilation, open a window or an outer door. A basic rule of thumb is that air should move from behind you, across your work and away from your face to the outside, see Diagram 2.

When you work with dangerous chemicals, protect yourself with overalls, correct gloves and masks. *Remember*, a mask is no substitute for ventilation. The mask must fit your face properly, making an air-tight seal. Make sure you have the correct cartridge for the chemical you are using and change the cartridges regularly.

Survival tips

Don't

- eat, drink or smoke in the work area
- use solvents to clean your hands- use a safe, non-toxic hand-cleaner, eg baby oil
- expose yourself unnecessarily to dangerous chemicals
- work in your bedroom, kitchen or other living area
- work in a pile of garbage
- put solvents or other toxic chemicals in the sewer
- work with solvents if you are pregnant (foetal damage may result)
- expose children, pets or friends to solvents and other dangerous art materials
- store art materials in food containers or the domestic fridge
- use eating utensils to mix or store your materials, and don't prepare or use them in the kitchen
- overload your domestic power system or run a tangle of cords that can trip you up

Do

- protect yourself
 - use safer chemicals where possible (non-toxic or less toxic art materials are available)
 - work in a well ventilated area. If you can't afford local ventilation open an outer door or window, or work outside
 - wash hands before eating, drinking, smoking or going to the toilet
 - use an appropriate mask, splash goggles and protective clothing when you handle solvents, acids and inks
 - keep lids on containers and trays when not in immediate use
 - label containers clearly and store all flammable chemicals in a fire-proof cabinet away from flames and heat
 - tie back your hair, don't wear loose-fitting clothing and remove jewellery when you work with machinery.
- Learn operating and emergency stop procedures. Put guards on equipment, eg dough mixers, saws

Have a regular medical check-up (give your doctor a list of the chemicals you use and tasks you perform)

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Educate yourself

- make sure you know what's in the materials you use v keep a file of Material Safety Data Sheets (available from manufacturers and suppliers)

Organize yourself

- make a place for everything and put it all away at the end of the day
- keep waste in metal bins with lids. Dispose of waste frequently
- adjust work benches and chairs to a safe working height
- maintain a first aid kit with burn cream, bandaids, eye wash (for chemical burns) and antiseptic cream V keep a small chemical fire extinguisher on hand (BCF type for multipurpose use)
- wet-mop your work area regularly (sweeping stirs up dust). Mop up spills immediately (refer to Material Safety Data Sheet for correct procedure)

Spoil yourself

- take frequent rest breaks when you perform repetitive tasks
- wash hands and exposed skin in soap and water immediately after work
- shower and change into uncontaminated clothing as soon as possible after work (or you and your friends will be soaking in chemicals all night)

Assert yourself

- insist that manufacturers and suppliers provide thorough Material Safety Data Sheets: don't buy from people who won't
- lobby for public access studios with good health and safety provisions

Accidents

- If chemicals have been accidentally swallowed do not induce vomiting unless specified on the product label. Call an ambulance immediately.
- Skin contact with chemicals flush the area with cold, soapy water for at least 15 minutes.
- Eye contact with chemicals flush the eye with cold water for at least 15 minutes. Fit your tap with a short hose which can be used as an eyewash.
- Seek medical attention for severe burns or exposure to fumes. You can call the Poisons Information Centre

Before we knew the dangers

Giuseppi Raneri is a well known Melbourne artist. For several years he suffered a persistent blood-nose. At the time he was using copper oxide. Each artwork had to be sanded. This produced copper oxide dust particles which perforate the nasal septum. The nose-bleeds ceased when he started wearing a mask. Giuseppi now wears a mask for all sanding work.

Artist X is a prominent metal sculptor. She had been aware of the risks of deafness amongst metalworkers and had used earplugs since the 1960's. Unfortunately, the plugs did not protect her from the noise and vibration of constant metal grinding in a confined space. As a result, she has suffered partial loss of hearing. She now wears industrial ear muffs and avoids grinding in a confined space.

Artist y is a sculptor. He almost lost his hand after attempting to clear foreign matter from an industrial dough mixer while it was in operation. This was something he had done many times before, but on this occasion his hand was caught up in the sharp blade of the mixer and he was rushed to hospital for emergency micro- surgery.

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What you do effects everyone else: the people you live and work with, your friends and the general community. The chemicals you use go into the air we breath and if you're careless they can end up in our water and food.

Exposing others to risk

The Environment

- There is no safe exposure to cancer-causing materials; substitute other products.
- Aerosols often contain toxic, flammable propellants that will harm you and the environment; use an atomiser instead but remember to use a suitable mask, goggles and gloves.
- Dispose of all your materials carefully. Almost everything you use can be recycled: Your local council can also pick up paper and waste for recycling. Commercial recycling companies will sometimes pay for wastes.
- Don't mix your chemicals, store them in separate containers for disposal.

Teaching

- Maybe you don't care what happens to you but you shouldn't impose unsafe work practices on others- besides that, *you could get sued* for negligence!
- It's your responsibility as a teacher to be informed about the chemicals you are using and to ensure that your students use art materials safely. Make sure you know how to treat injuries and deal with accidents.
- Adults with chronic illnesses and all young children should *not* be exposed to solvents, solvent-based adhesives, oil paints, permanent marker pens, aerosol sprays, acids, indian inks, non water-based paints and inks, dyes, clay dusts, glazes and oxides, epoxy resins and photo chemicals.

Your Rights

The Occupational Health and Safety Act outlines rights and responsibilities for art schools, teachers, artists, suppliers and manufacturers.

Manufacturers and Suppliers insist that manufacturers tell you what is in their products (ask for a Material Safety Data Sheet or MSDS). The MSDS lists the contents of the product, safety procedures for ventilation, protective clothing, fire and spillage, storage and first aid. If the supplier or manufacturer won't give you an MSDS, refuse to buy their product. Choose products that are well labelled. A product is not necessarily safe just because the label says *non toxic*.

Other Artists don't let the people you work with inflict their bad habits on you. Discuss safe work procedures with your colleagues. You can use the Studio Checklist in the back of this kit to assess the safety of your studio.

Self-Employment nobody else is going to take care of you. Budget for health and safety in your grant applications, when you take on commissions, or other employment as an artist. Build in a health and safety component when you price your artwork for sale. You can also declare your health and safety expenses, including fans, protective clothing and materials, on tax; keep all your receipts.

Art Schools and Public Access Studios should provide a safe work environment but poor funding limits their ability to do this. You can help them to help you by lobbying for health and safety funding.

One well-equipped, safe public access studio is worth more than all the converted bathrooms, bedrooms and kitchens in Victoria. If there is no public access studio in your field, contact your associations and galleries and start lobbying for one.

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It's important to know what's in the chemicals you're using. This is a brief guide to tell you what to look out for.

Many products used in sculpture are toxic if their dust, fume, liquid and gaseous form. A local ventilation system is a priority. Wear a particulate, gas or air-supplied mask, gloves, goggles and protective clothing as indicated. Wet mop chemical dust residue.

Substitute safer products where possible.

See our section Exposing others to risk for disposal advice.

Choose protective equipment that carries the Australian Standards logo.

Plastic additives

Skin, eye and respiratory irritants. Long-term effects can include cancer, lung-scarring, silicosis, major organ and nervous system damage. Use a mask with a particulate filter for cabosil (fumed silica), diatomaceous earth (uncalcined), flint, mica and sand (silica), talc (silica), wollastonite. Use a mask with a gas filter for styrene. Remember local ventilation is the only safe way to work with these chemicals. Don't use asbestos (substitute asbestos-free talc) and organic phosphates, eg tri-p-cresyl phosphate.

Plastic Resins

Skin, eye, respiratory, gastro-intestinal irritants, sensitizers. Long-term effects can include allergies, asthma, dermatitis, bronchitis, major organ and nervous system damage and cancer. Wear a combination gas and particulate mask for resins. Amino and phenolic resins use phenol and formaldehyde which are highly toxic. Machining, sanding or heating of these cured resins can release toxic gases. Epoxy resins use epoxy compounds and amine hardeners. Epoxy compounds may cause cancer. Amine hardeners are skin and lung sensitizers. Acrylic resins use methyl methacrylate monomer (irritates skin, eye and lungs and causes narcosis), benzoyl peroxide (explosive and must be used according to manufacturer's directions). Polyester resins use styrenes, methyl methacrylate, vinyl toluene, cobalt naphthenate, dimethylaniline, diisocyanates, amines, fluorocarbons which are variously toxic, flammable and explosive. Follow manufacturer's directions. Fibreglass is a skin and lung irritant and may cause mesothelioma. Polyurethane resins contain polyol and diisocyanates mixed with a catalyst (amine or organotin) and foamed with fluorocarbons. Diisocyanates are highly toxic to the lung. The amine catalyst is less toxic than organotin which can be absorbed by the skin. Fluorocarbon is toxic to the heart and the ozone layer! Silicones/natural rubbers use acetic acid, methanol, methylene chloride, peroxides which are toxic and highly explosive. Remember local ventilation is the only safe way to work with these chemicals.

Finished plastics

Skin, eye and respiratory irritants. Long-term effects can include asthma, allergies and fume fever. Polyvinyl chloride (PVC), polystyrene and polyurethane release highly toxic gases, eg fluorinated and chlorinated hydrocarbons (when heated) wear air-supplied mask with all acrylic plastics if you don't have local ventilation. If you have local ventilation use a combination gas and particulate mask. Remember local ventilation is the only safe way to work with these chemicals.

Stone

Some stone dusts contain silica and asbestos. Wear gloves, goggles and a particulate mask to protect yourself from the most toxic dusts and from sharp particles. Take care when lifting heavy weights- avoid back injuries by using trolleys, pulleys and levers. Stone dusts are skin, eye and respiratory irritants, some are gastro-intestinal irritants. Long-term effects include allergies, anaemia, silicosis, lung and gastro-intestinal cancer, major organ and nervous system damage. Possible asbestos contamination serpentine, soapstone (contains free silica), greenstone (may be toxic) and should be avoided. High levels of free silica agate, amethyst, flint, garnet, granite, jasper, mt barker rock, onyx, porphyry, quartz, sandstone, slate. Lower levels of free silica diabase, dolomite, limestone, marble, opal, pumice, soapstone, travertine, tripoli. Other stones with toxic compounds azurite, fluorspar, gypsum, turquoise (free silica), cement and fibro-cement sheeting (Possible silica asbestos). Don't use realgar, it contains toxic levels of arsenic.

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Woods

Wood dusts can be skin, eye and respiratory irritants. Long-term effects can include nose bleeds, dermatitis, asthma, kidney and eye damage, swelling of the scrotum and woods which are known carcinogens african mahogany and african walnut, nasal and sinus cancer. Moulds, fire retardents and anti-fungicidals present in wood dusts can cause asthma, hypersensitivity pneumonia and systemic poisoning. Avoid using woods which are known carcinogens – african mahogany and african walnut, douglas or oregon fir, european beech, european elm and european walnut, european and japanese oak, south american cedar, white cyprus pine. **Watch out for** african boxwood, american and grey box, australian blackwood, red cedar, birch, boxwood, brazilwood, cherry, chestnut, dogwood, east indian satinwood, ebony, mountain ash, mulga, myrtle, new guinea rosewood, oak, palm, pine, poison walnut, poplar, whitewood, redwood, sandalwood, sempilor (rimu), silver fir, south american cedar, spotted and yellow gum, white cypress pine and new zealand white pine, teak, walnut, yew. Wear a mask with a particulate filter and protect your skin with barrier cream and gloves.

Metal casting

Casting produces radiation (skin burns, eye damage) and toxic gases and fumes, eg carbon monoxide from the furnace, and lead and zinc fumes from the metals. Appropriate masks, gloves, infra-red goggles, or a face shield, and protective clothing should always be worn. Keep cylinders away from naked flame and solvents. You need good general ventilation and cooled air for most of this work. **The furnace** should have a chimney and a local exhaust system to extract fumes. The casting process can cause skin and eye burns, metal fume fever and produces respiratory irritation. Long-term effects include poisoning, major organ and blood damage. **Look out for** lead in pewter, brass and molten bronze (sometimes contains lead), bronze and zinc in brass (metal fume fever), nickel fumes and dust (lung and nasal cancer). Inhalation of nickel or ozone fumes can be fatal. **Avoid using nickel.** **Wear an air-supplied mask when working with metals that produce highly toxic fumes.** Wear a combination particulate and gas mask for all other metal fumes. **Moulds** containing silica flour, asbestos, french chalk (wear a dust mask and wet mop surfaces) should be substituted with graphite or asbestos-free talc. Use foundry sands instead of high silica sands or resin binders. **Remember** ventilation is the only safe way to work with these chemicals.

Welding

Oxyacetylene and electric arc welding produce ultra-violet radiation and toxic fumes and gases, eg metal fumes and ozone gas. Inhalation of ozone and nickel fumes can be fatal. **Avoid using nickel.** Appropriate masks, gloves, uv goggles, or a face shield, heavy boots and leather sleeves and leggings should always be worn. **Place fireproof shields** around welding units. **To avoid electric shock** ground the arc unit, cover cables and don't touch the metal electrode with bare skin. Metal fumes can be skin, eye and respiratory irritants. Long-term effects from the more toxic metals can include lung scarring, pulmonary oedema, fume fever, asthma, allergies, bone, tooth and nervous system damage and cancer. **Look out for** metal dusts and fumes from brass (copper, lead, zinc), brittania metal, bronze, titanium, manganese, pewter. **Do not** use beryllium, cadmium, chromium, lead, nickel. **Wear an air-supplied mask when working with metals that produce highly toxic fumes.** Wear a combination particulate and gas mask for all other metal fumes. **Remember** ventilation is the only safe way to work with these chemicals.

Soft soldering (to 350°C)

Fluxes and solders are skin, eye and respiratory irritants. The process can also cause burns. Long-term effects can be poisoning, pulmonary oedema or other lung problems. Fumes from fluxes containing rosin, oleic acid or other organic acids can cause chronic lung problems. These fluxes can be used with local exhaust ventilation or general ventilation and a fan to blow the fumes away from your face. Avoid **zinc chloride fluxes** which give off highly toxic fumes. **Soldering gives off lead fumes.**

Keep metal fume levels low by using minimal heat: electric irons and guns rather than gas torches. Wear a combination particulate and gas mask.

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Silver soldering (650-815°C)

Torches produce infra-red radiation (eye damage). Many solders and alloys produce highly toxic cadmium and zinc fumes. **Avoid cadmium solders.** Fluxes produce borax and highly toxic fluoride fumes. Most soldering requires, at least, good general ventilation; cadmium, zinc or fluoride require local ventilation. Wear goggles, a combination particulate and gas mask and use leather protective gloves to handle hot metal. Propane and liquified gases are highly flammable, keep them away from other flammable materials. **Remember** ventilation is the only safe way to work with these chemicals.

Forging and metal fabrication

The furnace produces radiation (skin burns, eye damage) and toxic fumes, eg carbon monoxide. A combination particulate and gas mask, gloves, infrared goggles, or a face shield, leather and safety shoes should always be worn. You need good general ventilation and cooled air for most of this work. The furnace should have a chimney and a local exhaust system to extract fumes.

Noise may be a problem and ear-muffs should be worn to avoid hearing loss. **Cutting, drilling and filing metal** produces metal filings which are skin and eye irritants (wear goggles). **Tools** and equipment should be handled strictly according to manufacturer's guidelines. **Remember** ventilation is the only safe way to work with these chemicals.

Solvents

Are skin, respiratory and eye irritants, cause narcosis, headaches and tiredness. Long-term effects are allergies, major organ and nervous system damage, cancer, miscarriage and birth and genetic defects. Solvents are used in resins, woodworking products, plastics and for the surface treatment of metals. **Don't use the carcinogens** benzene and carbon- and acetylene- tetrachloride, chloroform, trichloroethylene, ethylene dichloride, perchloroethylene, dioxane. Always substitute a safer solvent where possible, eg acetone.

Other less toxic solvents

For removing paint and varnish and as a lacquer and plastics solvent ethanol (ethyl, grain or denatured alcohol), methanol (methyl, wood alcohol, methylated spirits), amyl alcohol (isoamyl alcohol, fusel oil).

Exercise extreme care with styrene, toluene and xylene.

For degreasing metals, as a cleaning fluid and as a plastics and wax solvent methyl chloroform and methylene dichloride (these chemicals are highly toxic but are the safest of the chlorinated hydrocarbons). Wear a gas mask and gloves for all solvents. **Remember** ventilation is the only safe way to work with these chemicals.

Setting up a safe studio

Mark Douglas is a well known glass and metal sculptor. His concern about health and safety is reflected in both his practice and his studio set-up. The studio is in a large building with good natural ventilation.

The studio has a concrete floor which can be washed down. For safety reasons, forges and welding benches are kept in separate areas. Storage flammable chemicals are kept in sealed containers on shelves, away from the forge and welding benches. There are also storage shelves for tools.

Safe work Practices

Alternatives Mark used to mix his own glass chemicals but has now substituted recycled glass which is less toxic. When he welds Mark uses ultraviolet filter goggles, UV cream (to prevent radiation burns), a welding mask, a dust or vapour mask and protective clothing. He wears industrial earmuffs, heavy boots and gloves and the necessary mask for working at the forge

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