

Health and Safety advice in the Art Rooms

1. General

Enjoy the Art Rooms but please use common sense! Stop for a moment and think about what you are going to do. For example, if you are cutting materials: What might go wrong? What might be dangerous to you and others around? What might cause damage? Or, another example, if you are using materials that give off fumes: Have you read the information on the can or packet about how to use the material safely? Do you need to improve the ventilation or wear a mask?

Below is a set of more detailed advice about various tools and materials that you may use in the Art Rooms. Please ask me, Nigel, nrm32@cam.ac.uk if you need more support or are thinking of using materials not covered here.

This information sheet has been based on advice given by the National Society for Education in Art and Design (NSEAD).

Accidents?

There is a simple first aid kit hanging on pegs near the sink.

If it is not urgent, Susie Foster, the College Nurse, runs a 'drop-in' clinic every morning 10:00 – 12:00 and Tuesday and Thursday afternoons 14:00 – 16:00. Appointments are available outside of these times, please email susie.forster@kings.cam.ac.uk or phone 01223 331650 for availability and advice. You may also email to arrange a room visit.

2. Paints

Oil paints

Oil paints are a professional medium. Most artist's oil paints are made from a pigment and linseed oil. Unless marked as containing a hazardous material (check the label), oil paints do not pose a hazard and do not give off harmful fumes, but their use does require good standards of hygiene and hands should be washed thoroughly with soap and warm water before leaving the studio.

The use of thinners, oils and spirits for cleaning brushes and thinning the paint, does require good ventilation and thinners should be stored carefully. The disposal of cleaning rags impregnated with oil paint or cleaning spirit should be done thoughtfully. Paper based cleaning roll is safer and cheaper. Vigorous cleaning of brushes with a cleaning spirit may require the wearing of protective goggles to prevent particles of oil and spirit getting into the eyes.

Pigments

The use of dry pigments to make up paint can lead to inhaling dust. Personal protective equipment may be necessary. Some pigments may contain carcinogenic substances, such as arsenic and chrome.

Paint Spraying

The spraying of paint by airbrush, aerosol or on a larger scale with compressed air may produce a fine mist of pigment dust in the air, with solvent vapours which can then be inhaled. If large or regular amounts of spraying are done windows should be open and spraying should happen near the windows. Warn others to stay back. In any case, good ventilation is essential for all paint, ink or dye spraying.

3. Solvents

Volatile Substances

Solvents are generally highly volatile and toxic substances. They constitute the most common source of hazardous fumes in art and craft processes. Users of solvents or media containing solvents should find out exactly what they are and what they contain. This information is obtainable from the manufacturer or supplier.

Skin Irritants

Some solvents are primary skin irritants. Others may produce dermatitis and, by dissolving the natural grease of the skin, make it more vulnerable to damage by other substances.

Inhalation

Inhalation is the most common way in which toxic materials can enter the body. It is therefore very important that inhalation of solvent vapours is kept to a minimum.

Tetrachloromethane

Tetrachloromethane (eg, carbon tetrachloride), although non-flammable, is highly toxic by inhalation, in contact with skin or if swallowed, and should not be used.

Propanone (Acetone)

Propanone is one of the least toxic solvents, but it is highly flammable and should be used with extreme care.

Turpentine

Turpentine is neither highly toxic nor highly flammable, but it can be a primary skin irritant and possibly produce allergic reactions.

Aerosols

Aerosols present a considerable hazard, due to the presence of probably toxic and flammable solvents and other substances. They should be avoided if possible, but otherwise only used in a well-ventilated area. They should never be used when other people are near.

4. Using plastics

The two main forms of plastics likely to be used are thermo-plastics and thermo-setting plastics. Thermo-plastics are formed in a reversible process and can therefore be restored to their original form by the application of heat. They have the flammable hazardous properties of liquids rather than solids and can also give off toxic fumes at elevated temperatures. Thermo-setting plastics do not have reversible properties and are made by mixing polyester and other polymer resins with appropriate catalysts.

When shaping or cutting plastic materials either by hand or by machine, you should wear eye protection, but may also have to wear a suitable dust mask, depending on the nature and scale of the activity and the property of the plastic material. Work should always be carried out in a well-ventilated area. Do your own risk assessment to take account of the characteristic of the plastics being worked and where you are working, for example, the cutting or machining of plastics can cause cutting blades to heat up and melt the plastics, leading to re-warding of the cut and the blade jamming. The use of masking tape along the line of a cut can help prevent this and the effects of acrylic shattering if cut too fast. Hence, slower cutting should always be used when possible.

Uncured Polyester Resin

Uncured polyester resin releases phenylethene fumes. Provided that only small quantities are being used and the area is well ventilated the fumes may not be harmful, but the risk involved depends upon an individual's sensitivity and therefore the context needs to be individually assessed.

Glass Fibre

Some airborne fibre glass dust particles can cause lung damage and synthetic resins can be harmful to the skin. Suitable PPE should be worn, including disposable gloves, a suitable dust mask, eye protection and apron. Trimming of glass fibre matting (GRP) can be carried out in the open, but near others. During the hardening/curing process, fumes may be given off, which should not be released into a room when others are near, but instead the Art Rooms should be a restricted space during this process. Similarly, there should be no source of combustion present during the construction process and especially when cleaning up.

Polystyrene

Polystyrene should never be cut with ordinary knives heated by application to a direct heat source. Cutting polystyrene with a hot wire generates phenylethene fumes. The cutter should be constructed to operate at an even heat, which is just sufficient to cut the material. It is safer to use a battery-operated cutter than one powered by a low-tension supply. Cutting should be carried out only in well-ventilated conditions, for example, near an open window.

5. Working with wood

Some hardwoods produce dust, which may be a respiratory hazard, particularly when it is created by machines. There is a risk of dermatitis, other adverse reactions and injury from splinters. Dust extraction units should be provided for machines such as disc and belt sanders.

Cutting, shaping and piercing wood by both hand and machine methods should be done only when mechanical devices securely hold the material. Dust from working wood by hand is fairly limited, but when using machines for cutting, shaping and sanding, good levels of ventilation or dust extraction may be required.

6. Found materials

Scrap 'found' materials are often used for art, particularly for three-dimensional work. For more than 100 years, artists have used found materials, scrap materials and have recycled resources to make new art. They are a cheap means of extending the range of activities and encouraging experimentation and creative adaptation. At the same time, they raise the consciousness of ecological issues and importance of recycling. There are, however, obvious hazards related to storage, manipulation and processing, particularly where the source or properties of the found materials are unknown.

In addition, students may be given free resources or waste materials from local companies, or may be a member of a local materials resource bank. This can provide valuable resources, offer opportunities for new and untested projects and help subject budgets when tightly stretched. Such opportunities may present a challenge for creative experimentation and consequently to the risk assessment process, unless you have carefully analysed the materials and considered the possible hazards with processes, tools and equipment that may be needed to safely manage the making activities.

Handling, Shaping and Cutting

These processes, along with joining and dismantling, are all potentially hazardous and care should be taken to ensure that materials and objects are held securely and handled with care in an appropriate working environment. Think carefully about the selection and correct use of the appropriate tools for each material being worked.

Treating Surfaces

Treating surfaces that are already painted, dyed or covered with unknown materials should also be done carefully. Since little will be known about the composition of such surface materials, burning or the application of other chemicals can cause hazardous reactions.

Personal Hygiene

Hands should be thoroughly washed after working. Appropriate personal protective clothing and PPE should be worn and care taken to avoid inhalation or ingestion of unknown substances.

Storage

Storage of scrap materials should be considered as part of normal 'housekeeping', and regular clear-outs should be made.

7. Soldering

Here the main concern is the fumes that are released when rosin-based solder fluxes are heated. Consequently only rosin free solders should be used. Nevertheless it is still essential that this activity only takes place in a well-ventilated area. Burns and scalds are also a potential hazard.

Mains voltage soldering irons should be fitted with rubber insulated leads to prevent damage to the leads from hot soldering irons. The use of a safety stand to hold the soldering iron between uses, will greatly reduce the risk of damage and burns and will also extend the life of the bit.

The use of Butane fuelled soldering irons is not recommended in art and design.

8. Using Dyes

Careful selection and use is essential. Care should be taken to avoid accidental inhalation, ingestion or skin absorption. Free textile information sheets are available from the Health and Safety Executive, or from other industry organisations:

- Dyes and chemicals in textile finishing : an introduction (Textile Information Sheet No 1)
- Non-dyestuff chemicals : safe handling in textile finishing (Textile Information Sheet No 2)
- Dyestuffs: Safe handling in textile finishing (Textile Information Sheet No 3)
- Hazards from dyes and chemicals in textile finishing: a brief guide for employees (Textile Information Sheet No 4)
- Reactive Dyes ; Safe handling in textile finishing (Textile Information Sheet No 5)
- Dust control in dyestuff handling (Textile Information Sheet No 6)
- Selection and safe use of spotting solvents in textile and clothing industries (Textile Information Sheet No 7)

Dye Powders

Dye powders are very fine, and therefore dangerous if inhaled. They should be mixed when wholly immersed in water or, if this is not possible, a dust mask or respirator should be worn. Heavy-duty rubber gloves should be worn to avoid skin contamination. Cooking utensils should not be used, as they may retain potentially hazardous amounts of chemicals. Personal protective clothing should be worn and there should be no eating, drinking or smoking in a dyeing area. Only soap and water should be used to remove splashes from the

skin, as chemical substances such as bleach or potassium manganate (VII) might break down the dyes into hazardous substances.

Direct Dyes

Direct benzidine-type dyes are a component of all-purpose dyes. These may be toxic and care should be exercised.

Acid Dyes

These are used for silk and wool, and are probably the least hazardous.

Basic Dyes

These dyes, used for wool, silk and some synthetics, may cause allergic reactions.

'Procion' Dyes

These are also known as fibre-reactive or cold-water dyes. Reactive dyes are extremely reactive chemical compounds and are capable of reacting with body tissue. The respiratory tract is particularly sensitive to reactive dyes and allergic responses may occur. Symptoms may seem like hay fever or asthma, accompanied by swollen eyes.

Synthetic Mordant Dyes

These may be used in dyeing wool, and the most hazardous mordant salt is potassium dichromate. Other metal salts such as chromium cobalt, copper and so on may be both toxic and corrosive, and it is recommended that alum (potassium aluminium sulphate) salts of tin or iron be used instead.

Azoic Dyes

The constituent materials of these dyes, 'fast bases' (fast salts) and 'naphthol', are highly reactive chemical compounds capable of causing dermatitis and other skin disorders.

9. Adhesives and Fixatives

Irritants

Some forms of adhesives, such as epoxy resins, can be irritants. Sensible precautions must be taken to avoid skin contact. If it is considered necessary to use contact adhesives that give off heavy, toxic or flammable vapours, good ventilation is essential. Aerosol-propelled fixatives and adhesives should only be used in controlled conditions with adequate ventilation.

'Super Glues'

Be very careful with these cyanoacrylate-based adhesives, which can instantly bond body tissues.

Glue Guns

Glue guns propel electrically heated hot-melted glue through a nozzle onto the surfaces to be joined. They can propel the hot glue as drops or a continuous stream, using either a trigger or by applying pressure on the cool end of the glue stick projecting out of the back of the gun. When not being used, but still heated, they can drip hot glue and so care should be taken to place them correctly on their wire stand, so dripping poses less risk. Glue guns are fitted with short cables to reduce the hazards from tripping, although snagging remains a more significant problem to the user if the glue gun is 'jerked' while being used.

Glue gun adhesives solidify rapidly as they cool and therefore enable quicker working practice. However, this can present a potential for injury where pupils are working three-dimensionally and there is a risk of molten glue dripping onto exposed skin. The positioning of a glue gun area working area needs careful planning to provide good ventilation, the positioning of electrical sockets so there are no trailing cables, and sufficient undisturbed working space away from pupil movement.

Petroleum-Based and solvent-Based Adhesives

These must be properly stored as the solvents may be flammable, although some products may not.

This form of adhesive is normally applied in a thin coating to both surfaces, the solvent is then allowed to evaporate or become touch dry prior to both surfaces being brought together firmly. Use within a well-ventilated area is essential and such adhesives should not be applied to large surface areas without careful risk assessment.

10. Plaster of Paris

Plaster of Paris is a versatile material for three-dimensional work. Plaster of Paris is available in two basic forms, as a white powder sold typically in 1, 10 and 25 kilo bags, or as a form of plaster impregnated bandage/scrim, sold in cut sheets, small rolls and multi-roll packs. Plaster of Paris hardens through a chemical reaction initiated through contact with cold water or even dampness in the air. In powder form, plaster should always be mixed by adding the powder to cold water, never water onto powder. Plaster impregnated scrim pieces (Mod-Roc) are placed in cold water for seconds to absorb water, before being placed and formed over the armature and the surfaced smoothed, usually by hand.

Cold water is used to ensure sufficient working times. The use of warm or hot water will accelerate the chemical hardening process, which may prove hazardous if the materials harden too rapidly while you are still handling the plaster slurry or sheets. On contact with water, this material hardens and then slowly becomes hot. Temperatures as high as 60

degrees centigrade can be reached. Skin damage can result at much lower temperatures, perhaps as low as 45 degrees centigrade, if contact is prolonged.

Making a cast enclosing any part of the body using this material is potentially very dangerous, particularly if the thickness of the cast exceeds a few millimetres. As a rule of thumb, if a decision to make a cast is made despite this clear warning, use no more than two layers of scrim impregnated with plaster, e.g. ModRoc.

Hands, fingers, parts of the body should never be submerged into liquid mixed plaster of Paris and held there until the plaster hardens.

Failure to follow this guidance can cause severe burns that may require surgical removal of affected tissue or amputation of digits or a limb.

Direct, prolonged or repeated contact with the skin may cause irritation and attempts at removal can result in abrasions. Rinse with water until free of material to avoid abrasions, then wash skin thoroughly with mild soap and water.

If Plaster of Paris is in contact with eyes, first rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

Plaster of Paris dust needs to be controlled as it is an irritant that can cause breathing difficulties that are usually mild.

Storage of Plaster of Paris and Plaster impregnated bandage/scrim should be in sealed containers to prevent any moisture or even damp air initiating a chemical reaction, rendering the materials unusable. Plaster of Paris powder should be handled using a scoop and when adding to cold water, limit shaking and the raising of dust into the air. Open bags of plaster must be kept sealed.

You can always contact Nigel Meager nrm32@cam.ac.uk for more advice about health and safety in the Art Rooms