

Chemical Safety Guidelines for managing risks with chemicals in Catholic Safety Health and Welfare SA – Education sector



- Administration
- Agricultural Studies
- Art
- Home Economics
- Science/Laboratory
- Technical Studies

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Contents

REFERENCE DOCUMENTS	7
1. INTRODUCTION	8
Duties of Principals	8
Chemicals, Hazardous Chemicals and Dangerous Goods – What are they?	9
What is a Dangerous Good?.....	9
2. SITE SAFETY.....	11
General Safety Guidelines	11
Induction & Training.....	12
Principals Duty to Provide Training	12
People Who Require Induction and Training	12
What Induction/Training is Required?	12
Emergency/First Aid.....	13
Fire Prevention.....	14
The Assessment Duty	15
Prioritise Assessments	15
What is Involved in the Assessment?	16
Review of Information about Hazardous Chemicals.....	16
Identification of Risks	17
Generic Assessments	17
Detailed Assessments.....	17
Action Arising from the Assessment	17
Who Should Perform the Assessment?	17
Competency to Perform Assessments.....	17
Recording of Hazardous Chemical Risk Assessments	18
Revision of Assessments	18
Length of Time Risk Assessment Forms MUST be Kept	18
Access to Risk Assessment Forms.....	18
Consultation	18
Control	19
Principal’s Duty to Prevent or Control Exposure.....	19
Maintenance, Examination and Testing of Control Measures.....	19
Hierarchy of Controls.....	19
Elimination	20
Substitution.....	20
Isolation.....	21
Fume Cupboards.....	21
Engineering.....	22
Housekeeping	22

Ventilation	23
Purpose of Ventilation.....	23
Air Conditioning	23
Safety Shower and Eyewash Facilities	24
Personal Protective Equipment	25
4. CHEMICAL MANAGEMENT	27
Purchasing	27
Hazardous Chemicals Register	27
Safety Data Sheets	28
What if the Supplier Will Not Provide a Safety Data Sheet?	28
Labeling Hazardous Chemicals	29
What is a Label?	29
What Should be on a Label?	29
Where Does the Label Come From?.....	30
What if the Chemical is Poured into Another Container?	30
Labeling of Decanted Chemicals	30
Unlabeled Containers	30
Types of Chemicals	31
Class 1 – Explosives	31
Class 2 – Gases	31
Class 3 - Flammable Liquids	32
Class 4 – Flammable Solids:	32
Class 5 – Oxidizing Chemicals; Organic Peroxides	32
Class 6 – Toxic and Infectious Chemicals	33
Class 7 – Radioactive Materials	33
Class 9 – Miscellaneous Chemicals	34
Health Hazards.....	34
Chronic Health Hazards	34
Environment.....	35
Equipment	35
Space	35
Furniture, Layout and Ergonomics	35
Safety Colour Codes and Signage	36
Transporting Chemicals	36
5 ADMINISTRATION ENVIRONMENT	38
Canteen Staff	38
Cleaners	38
Contractors	38
Grounds and Building Maintenance	38
6 AGRICULTURAL STUDIES ENVIRONMENT	39

Chemical Safety Equipment	39
Personal Protective Equipment (PPE).....	39
Cleaning/Housekeeping	40
Spillage	40
Waste Disposal	40
Ventilation and Air Quality	41
Fume Extraction, Dust and Fume Control.....	41
Gas/Air/Water	41
Gas Cylinders.....	41
Storage.....	41
Storage of Flammable Chemicals	42
Graphic Arts Media.....	44
Photography.....	45
Plastics, Acrylics, Epoxy Resins.....	45
Pottery and Ceramics.....	46
Woodworking.....	46
Chemical Safety Equipment	46
Personal Protective Equipment (PPE).....	47
Cleaning/Housekeeping	47
Spillage	47
Waste Disposal	48
Ventilation and Air Quality	48
Fume Extraction.....	48
Gas/Air	49
Gas Cylinders	49
Storage.....	49
Storage of Flammable Chemicals	50
8 HOME ECONOMICS ENVIRONMENT	51
Cleaning Agents	51
What Action Can be Taken?	51
Chemical Safety Equipment	52
Personal Protective Equipment (PPE).....	52
Cleaning/Housekeeping	53
Spillage	53
Waste Disposal	53
Ventilation and Air Quality.....	53
Fume Extraction.....	54
Gas	54
Gas Cylinders	54
Storage.....	54
Storage of Flammable Chemicals	55

9 SCIENCE LABORATORY ENVIRONMENT	56
Safety Equipment	56
Personal Protective Equipment (PPE).....	57
Cleaning/Housekeeping	57
Spillage	57
Spill Kits	58
Waste Disposal	58
Ventilation and Air Quality	59
Fume Extraction, Dust and Fume Control.....	59
Water	59
Gas Cylinders.....	59
Biological.....	60
Safety Showers and Eyewash Facilities.....	60
Storage.....	60
Storage of Flammable Chemicals	61
Flammable Solids [Class 4.1] (store above liquids)	62
Flammable Liquids [Class 3].....	62
Storage of Dangerous When Wet Chemicals.....	62
Dangerous When Wet Chemicals [Class 4.3]	62
Storage of Corrosives	63
Corrosives [Class 8].....	63
Organic Alkalis	63
Inorganic Alkalis.....	63
Organic Acids	64
Inorganic Acids.....	64
Storage of Oxidizers	64
Oxidizing Agents [Class 5.1]	64
Storage of Spontaneously Combustibles	65
Spontaneously Combustible Chemicals [Class 4.2].....	65
Preparation of Explosive Mixtures.....	65
Heating of Materials.....	65
10 TECHNICAL STUDIES ENVIRONMENT	67
Major Processes Found in This Environment	67
Metal Work.....	67
Health Hazards of Welding	67
Gases and Fumes	67
Soldering	68
Woodwork.....	68
Dusts.....	68
Fumes	69
Plastics	69

3D Printing	69
Chemical Safety Equipment	69
Personal Protective Equipment (PPE)	70
Cleaning/Housekeeping	70
Spillage	71
Waste Disposal	71
Ventilation and Air Quality	72
Fume Extraction, Dust and Fume Control	72
Air	72
Gas Cylinders	72
Storage	72
Storage of Flammable Chemicals	73

Acknowledgements

These Guidelines have been prepared using resources available from the various state education authorities, state legislature and various public available documents. Specific acknowledgement is made of:

- Standards Australia – Various Standards.

Reference Documents

- Work Health and Safety Act 2012 (SA)
- Work Health and Safety Regulations 2012 (SA)
- Code of Practice: Labelling of workplace hazardous chemicals
- Code of Practice: Managing risks of hazardous chemicals in the workplace
- AS 1318: SAA Industrial Safety Colour Code
- AS 1319: Safety signs for the occupational environment
- AS 1892: Portable Ladders
- AS 1940: The Storage and Handling of Flammable and Combustible Liquids
- AS 1668: The use of mechanical ventilation and air-conditioning in buildings
- AS 2243.8: Safety in Laboratories – Fume Cupboards
- ChemWatch website – www.chemwatch.com.au
- Code of Practice for the Safe Use of Ionizing Radiation in Secondary Schools, <https://www.arpsa.gov.au/regulation-and-licensing/regulatory-publications/radiation-health-series>

1. Introduction

These Guidelines provide information and recommendations relating to chemical safety in the school environment. They do not provide detailed information on specific standards required for all aspects of a school site.

The Guidelines combine the previous “Laboratory Chemical Safety Manual” and “CSH&W Chemical Safety Manual” plus includes new Sections related to obvious areas of chemical use within an education setting.

This document should be read in conjunction with the Catholic Church Safety Policy and Procedures. Further information can be found in the relevant State Legislation, Codes of Practice and related Australian Standards. It can also be obtained from Catholic Safety Health and Welfare.

Principals MUST be familiar with the content of the entire Guidelines document.

The use and storage of chemicals involves potential risk and it is the responsibility of the school to ensure that these risks are minimised for staff and students.

Principals and all school staff involved with the use of chemicals MUST ensure that all activities related to the use of chemicals are part of the schools risk management strategies. This includes hazard identification, assessment and the implementation of control strategies.

Duties of Principals

Principals MUST ensure that their plant and chemicals are in a safe condition and that their systems of work and working environment are safe.

They MUST:

- Obtain up-to-date Safety Data Sheets (SDS) from their suppliers of hazardous chemicals and ensure that this information is readily available to staff;
- Keep a readily accessible register of all hazardous chemicals used or produced by the school;
- Ensure that all chemical storage containers are suitable for the chemical they contain and are correctly stored and labeled; **Food and beverage containers MUST not be used.**
- Provide information, instruction and training to staff (particularly new staff) or contractors who could be exposed to hazardous chemicals. This should include advice about health hazards, understanding labels on containers and how to access the SDS;
- Monitor exposure levels and provide health surveillance when necessary;
- Identify, assess and control all risks to staff or other persons who could be exposed to hazardous chemicals;
- Maintain records of all risk assessment reports, instruction and training associated with hazardous chemicals;
- Provide appropriate training to staff who use or store chemicals;
- Evaluate competency of staff and keep records of training and demonstrated competency;
- Principals MUST ensure that a hazardous chemical contained in an enclosed system (such as pipe or piping system, or a process or reactor vessel) is identified to any person who could be exposed to the chemical.

Chemicals, Hazardous Chemicals and Dangerous Goods – What are they?

Chemical is a general term that includes substances, products and preparations composed of elements, compounds or mixtures. Chemicals may exist as solids, liquids or gases. Chemicals may be classed as hazardous or non-hazardous, or as a dangerous goods depending on their potential to cause harm to workers, the environment or property.

Hazardous chemicals are chemicals that have the potential to harm your health; they are any substance, mixture or article that satisfies the criteria of one or more Globally Harmonised System of Classification and labelling of chemicals (GHS) hazard classes. Hazardous chemicals are determined to be a hazardous Chemical by the manufacturer or importer of the Chemical on the basis of NOHSC's "Approved Criteria of Classifying Hazardous Chemicals".

Hazardous chemicals regulations apply to the chemicals that are used or produced in a work activity and that have specific health effects. Hazardous chemicals may be toxic, very toxic, toxic to reproduction, harmful, corrosive, irritant, sensitizing, carcinogenic, or mutagenic.

Often hazardous chemicals will be industrial chemicals. They may be pesticides, paints, drugs, cosmetics, solvents, adhesives, petroleum products, heavy metals, or chemicals that are produced in work activity.

Hazardous chemicals include some "dangerous goods" (e.g. chemical covered by the Dangerous Substances Legislation). However, these are only included as hazardous chemicals if they have health effects. The hazardous chemicals regulations focus on controlling risks to health.

For users, the easiest way to determine if a chemical is hazardous, is to look on the label for the words 'hazardous', 'caution', 'poison', 'dangerous poison', 'harmful' or 'corrosive', or other advice about specific health effects. The supplier of a hazardous chemical (except a retailer) **MUST** provide a safety data sheet (SDS) which can also be checked for information about the health hazards. If a Chemical is purchased from a retailer an SDS can be requested from the manufacturer or importer.

For chemicals produced in the workplace, e.g. by-products or emissions for which there is no label or SDS, the employer will need to identify the chemical and check the NOHSC List of Designated Hazardous Chemicals or other resources to find out if it is hazardous.

A chemical should always be assumed to be hazardous unless there is information to show that it is not.

Additional information can be requested from the manufacturer or other supplier.

What is a Dangerous Good?

Dangerous goods are chemicals and articles (e.g. matches, car batteries) classified on the basis of immediate physical or chemical effects such as fire, explosion, corrosion, oxidation, spontaneous combustion and poisoning that can harm property, the environment and/or people. They may be solids, liquids, pure chemicals or mixtures. Dangerous goods are listed in the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code).

Many chemicals are classified as both hazardous chemicals and dangerous goods.

Schools engage in very diverse activities involving the use of chemicals. This set of guidelines identifies six possible activity areas within the school environment that may need to be considered in the identification of chemicals and their potential for producing hazardous situations in the work place. Depending on the functions, size and curriculum offering of the school some or all of the following may apply to your school site:

(1) Administration, (2) Agriculture, (3) Art, (4) Home Economics, (5) Science, (6) Technical Studies

Whatever the area within which an individual works there is always the possibility for the introduction of a hazardous material and the development of unsafe practices. Be aware of the products you are using and possible safety requirements.

Administration Environment

This area identifies a set of support services for the school environment that involve the use of chemicals in the general course of their activities. Care in the use of chemicals therefore will be looked at under the headings of Canteen Staff, Cleaners, Contractors, First Aid, Grounds / Building Maintenance and Office/Printing Facilities.

Agricultural Studies Environment

The area of Agricultural Studies may also include topics on Floriculture, Horticulture and Viticulture. The use of chemicals in these areas in industry is substantial. Any school having classes or activities involved in these pursuits and using chemicals as part of their processes, need to make their practitioners aware of industry safety standards in relation to their area of activity.

Art Environment

Art teachers and students might assume that all arts materials are safe, based on the simple fact that the materials are readily available. However, some of these materials can pose a hazard if the safety instructions set out on the product label are not followed. It is in the interests of all that the least hazardous products are used. There are many safe alternatives to the types of products used in the industry in general.

Home Economics Environment

The main concern in relation to hazardous chemical in this environment revolves around the use of flammable chemicals and cleaners. Some other chemicals may be a potential hazard, particularly to instructors, (as skin, airway irritants) with frequency of use or high levels of personal sensitivity.

Science Environment

This is an area of obvious chemical hazard due to the nature of the activities and resources used in the laboratory environment. Very strict criteria relate to the purchase, storage and procedures for the use of chemicals as part of science programs.

Technical Studies Environment

Welding, brazing, soldering, metal cutting, the use of glues, paints, stains and solvents are all processes that involve potentially hazardous chemicals. All care needs to be taken in the selection of the LEAST hazardous materials to be used in the varied processes required in this environment and strict guidelines followed where obviously hazardous material is in use.

2. Site Safety

Anyone who handles and uses chemicals MUST be instructed about any potential hazards or risks associated with their use, and MUST follow any reasonable instruction in the interest of their safety and the safety of others.

General Safety Guidelines

- Hazards MUST be identified. Risk assessments MUST be carried out and documented before purchasing or acquiring new equipment or chemicals.
- Keep stocks of chemicals to a minimum. Stockpiling chemicals creates storage risks and some chemicals may have limited shelf life.
- Inspect chemical containers regularly as many deteriorate over time and may increase the likelihood of spills or fumes.
- At the beginning of the year and anytime there are new students/staff they MUST be given a tour of the teaching/work facilities and be provided with the rules relating to that facility by the relevant staff member. Individual teachers are responsible for specific inductions.
- Risk assessments of activities MUST be conducted and documented and control measures implemented. The person responsible for the activity is accountable for its safe operation, and for enforcing precautions necessary to prevent injury.
- Ensure Safe Operating Procedures are available and they are understood and followed and displayed prominently on, or with, all relevant equipment.
- Teaching, preparation and maintenance areas using chemicals MUST be locked when staff members are not present.
- Following a practical activity or required task, the person responsible should check that all equipment and services (e.g. water, gas, and electricity) are turned off.
- If contractors are working in the area, make known to them any hazards which may exist.
- When relevant, ensure that 'working alone' precautions are in place.
Refer to the Remote and Isolated Work Procedure Document No. 17.
- All maintenance of equipment should be recorded in a maintenance register.
Refer to Management of Plant Procedure Document No. 15
- All work areas should be kept clean, tidy and uncluttered.
- Electrical equipment deemed unsuitable for repair MUST be tagged appropriately and have any plug or attachments removed prior to disposal.
Refer to the Electrical Procedure Document No. 9.
- After use, clean and return apparatus/equipment and chemicals to the designated storage area.
- Store heavy items at a low level (ideally between knee and waist height).
- Dispose of waste and particularly flammable waste regularly. Do not allow waste to accumulate. Place solid wastes in a suitable bin, and not in sinks.
- Maintain items of equipment in good condition.
- Use a fume cupboard/spray booth/ and or ventilation systems when handling chemicals that generate harmful gases, vapors, mists or dusts.
- Use only clean containers. Wash and rinse glassware and other apparatus/equipment thoroughly before drying.
- Correctly label all containers used to store chemical chemicals.

- Cover, with waterproof dressing, any wounds before handling chemicals.
- Wash hands thoroughly and replace any dressings after practical activities, particularly when work has involved handling chemical chemicals or biological materials.
- Prohibit consumption of food and drink in areas where hazardous chemicals or biological materials are stored and used.
- Wear appropriate personal protective equipment.
- Wash hands regularly during use of chemicals and always when finished.
- Drinking from containers used for chemicals is not permitted.
- Decanted chemicals should not be returned to the original container as they may be contaminated.
- Food containers such as bottles or jars MUST NOT be used to store chemicals.
- Materials to handle spillage MUST be available.
- Chemicals MUST NOT be tasted.
- Food and drink MUST NOT be stored in a refrigerator used to store chemical materials.

Induction & Training

The type and level of information, instruction and training will depend on the risks present; work being carried out; and the skills, knowledge, experience and literacy of the people to be trained.

Principals Duty to Provide Training

Principals MUST provide induction and training to all staff who could be exposed to hazardous chemicals at work. Principals also have the responsibility to ensure all contractors, visitors and volunteers have received the appropriate training and induction if they are going to be exposed to hazardous chemicals whilst on site.

The Principal MUST keep records of induction and training. Records MUST include the names of people receiving training, an outline of the course, and details of training providers.

Induction and training records MUST be kept for the duration of the workers employment. Contractor/volunteer inductions are to be retained for 7 years.

People Who Require Induction and Training

- all staff who could be exposed to hazardous chemicals at work;
- staff who supervise others who work with hazardous chemicals;
- contractors, visitors and/or volunteers who will be exposed to hazardous chemicals whilst on site.

What Induction/Training is Required?

A hazardous chemicals induction and training program should include:

- container labels and how to understand them;
- safety data sheets (SDS), how to access them and how to understand them;
- information about the hazardous chemicals, including the type of health effects, the risk involved in particular work, the degree of exposure and how the hazardous chemicals can get into the body ('routes of entry');
- the hazardous chemicals assessment process and how staff can contribute;

- work practices and procedures for the safe use, handling, processing, storage, transportation, clean-up or disposal of hazardous chemicals;
- the correct use and maintenance of control measures;
- the proper use and fitting of personal protective equipment;
- emergency procedures, incident reporting and first aid;
- location of emergency showers; eye wash stations and spill kits;
- information about any monitoring – what is needed, why and access to results;
- information about any health surveillance – what is needed, why, access to results, and workers' rights and obligations;
- isolation devices available in the work area (e.g. gas / electricity shut off)
- The duties of suppliers, the Principal and staff under the hazardous chemicals regulations.

If literacy levels are low, then verbal or visual training methods should be used. If staff are from Non English speaking backgrounds, training should be provided in the languages used by staff at the workplace.

Training should be updated each time there is a change in health hazard information about chemicals and change to the work practices or control measures.

Induction and training should be provided to new staff, staff who are performing particular work for the first time or staff who need a refresher.

- New staff MUST be inducted prior to commencing work with chemicals.
- All staff who are likely to be exposed to hazardous chemicals MUST be trained in the safe use of those chemicals. Training MUST be appropriate to level of risk.

Emergency/First Aid

Exits from buildings and other work areas MUST be clearly identified and access to them kept clear.

- Fire extinguishers of the correct type MUST be readily available.
- Regularly test shower and eye-wash facilities where these are part of the facility.
- All breakages and spills MUST be dealt with immediately.
- Safety signs and any marked safety zones MUST be respected at all times.
- Individual schools MUST consider their potential risks and develop a site specific emergency plan.
- Signpost the location of the first aid kits (this can be just a white cross on a green piece of paper located above the kit, or placed on the cupboard door).
- Decide who will be responsible for maintenance of the first aid kit and check the contents on a regular basis.
- Ensure all staff/volunteers are aware of the requirement to complete the First Aid Register.

Analyse at a relevant meeting, the First Aid Register to determine if there are any trends e.g. injuries in a particular area or using a particular chemical. Refer to First Aid Procedure Document No: 11

Fire Prevention

The following is the minimum standards for fire prevention:

- no smoking in enclosed areas;
- no open flames should be left unattended and no open flames should be used near any flammable solvents;
- do not pour flammable liquids into sink or drainage systems;
- be familiar with fire procedures;
- be familiar with the use of the fire-fighting equipment

3. Risk Assessment

The purpose of a risk assessment is to enable decisions to be made about appropriate control measures, induction and training, monitoring and health surveillance as may be required by the hazardous chemicals regulations.

The assessment process enables a distinction to be made between 'hazard' and 'risk'. If a chemical is hazardous it has the potential to be harmful to health. The risk is the likelihood that harm will be caused in the actual circumstances of use of the chemical.

Decisions about appropriate action to protect staff will depend on the degree of risk to health that arises from the use of hazardous chemicals in particular work.

The Assessment Duty

The Principal or delegated officer has the responsibility to ensure that a suitable and sufficient assessment is made of any work involving potential exposure to any hazardous chemical using the Management of Hazardous Chemicals Procedure Document No.19.

It is only necessary to assess work where there is potential for exposure. For example, work involving the handling of unopened containers of hazardous chemicals would not need to be assessed if those containers are unlikely to be opened or damaged. However, if those containers are opened or damaged so that exposure to the contents might occur, an assessment would be required.

The assessment focuses on work situations rather than individual chemicals. A practical way to carry out assessments in a workplace would be to divide the work up into jobs or tasks and assess the risks involved in each of these situations.

Hazardous chemicals that are considered as a consumer product do not require SDS or a risk assessment to be completed.

NB: *consumer product* means a thing that—

- (a) is packed or repacked primarily for use by a household consumer or for use in an office; and
- (b) if the thing is packed or repacked primarily for use by a household consumer—is packed in the way and quantity in which it is intended to be used by a household consumer; and
- (c) if the thing is packed or repacked primarily for use in an office—is packed in the way and quantity in which it is intended to be used for office work;

Prioritise Assessments

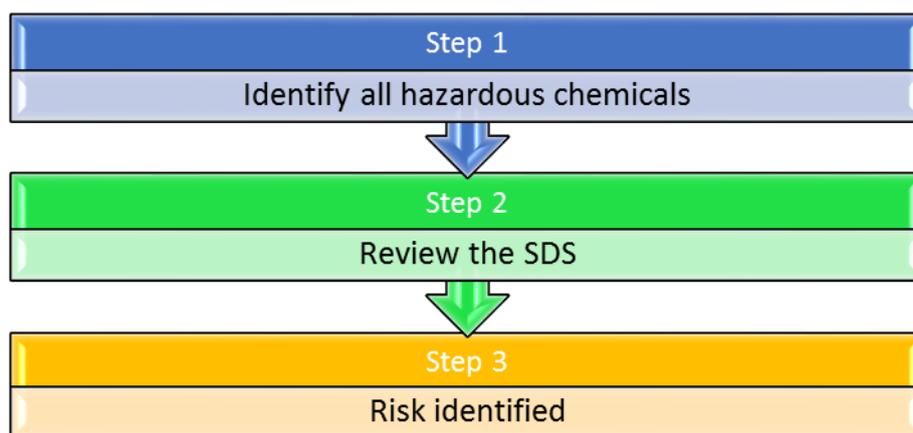
In deciding which assessments to do first, think about where:

- complaints, accidents, incidents and illnesses have occurred;
- more hazardous chemicals are used or stored;
- safety measures are not in place or used;
- there is likely to be a greater risk to health or property;
- more people or areas are likely to be affected.

Areas where little or no assessment has taken place should also be considered a priority.

What is Involved in the Assessment?

There are three steps that MUST be included in any suitable and sufficient assessment.



The first step is to identify all hazardous chemicals used or produced in the work being assessed. This should be done as follows:

- For chemicals supplied to the workplace, the label and SDS for each Chemical should be checked to establish whether it has been determined to be a hazardous chemical. When checking the supplier's label, look for signal words e.g. 'caution', 'poison', 'dangerous poison', 'hazardous' and risk phrases that indicate the type of health hazard. If there is any doubt about whether the chemical is hazardous, further information should be requested from the supplier.

Any chemical determined to be hazardous by the manufacturer or supplier (as indicated on the label or SDS), and any chemical listed in the GHS Hazardous Chemical Information List MUST be considered in the assessment process.

http://hsis.safeworkaustralia.gov.au/GHSInformation/GHS_Hazardous_Chemical_Information_List?

Manufacturers and importers of chemicals supplied to a workplace are required to determine if a chemical is hazardous, and to correctly classify the chemical according to the 3rd Revised Edition of the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*.

Review of Information about Hazardous Chemicals

The second step is to review the SDS to check on the health hazard information, precautions for use and safe handling information. If there is no SDS or the SDS cannot be practicably obtained, equivalent information should be obtained in each of these areas. The use of equivalent information should be limited to situations where:

- the hazardous chemical is produced in the workplace and not supplied outside, and the SDS does not exist; or
- the assessment is being undertaken in unusual circumstances, such as away from the usual place of work, and work MUST proceed.

Some products, for example, hazardous chemicals in retail packages, may have sufficient information on a consumer package label to address the likely situations of exposure which would include spillage and disposal of this material.

Identification of Risks

The third step is risk identification. The risk to health will depend on the hazardous chemicals used or produced in the work, the nature and severity of the potential health effects and the degree of exposure that occurs. For example, the risk will be greater if a person has significant exposure to chemicals that have serious health effects.

To identify the risk of exposure, the particular work should be inspected to establish what control measures are used, whether they are effective in controlling exposure and whether they are properly used and maintained.

Generic Assessments

Often a particular hazardous chemical(s) is used in the same or similar circumstances in a number of different work areas within the school. In such situations, the nature of the hazard and the degree of risk may be comparable. Accordingly, a single assessment of one representative work situation can be applied where the circumstances of use for the hazardous Chemical(s) are essentially the same (e.g. common cleaning agents for practical subject areas)

Detailed Assessments

For some work a more detailed assessment may be required. These situations include those where:

- there is uncertainty about the degree of risk;
- there is significant risk to health, for example, exposure to a hazardous chemical may be high and/or the nature of the health hazard is serious; or
- more complex chemicals processes and/or exposures are involved.

A more detailed assessment might involve obtaining additional information about health hazards, a thorough evaluation of the work to determine exposures (including monitoring where appropriate), and examination or testing of existing control measures.

Action Arising from the Assessment

Where the assessment indicates that there is a significant risk to health, further decisions will be needed to:

- select appropriate measures to achieve and sustain control;
- ensure that those control measures are properly used and maintained;
- arrange induction and training; and
- determine if monitoring or health surveillance are required.

Who Should Perform the Assessment?

Responsibility for the assessment lies with the Principal. It is anticipated that the assessment will usually be done by the Principal or delegated officer, in cooperation with the relevant staff. Assistance may be sought from relevant professionals (external providers) with elements of an assessment which require special expertise.

Competency to Perform Assessments

A person carrying out an assessment is considered competent if he or she has sufficient knowledge and skills to evaluate the health risks to staff arising from operations involving the use of hazardous chemicals in the workplace.

Recording of Hazardous Chemical Risk Assessments

Assessments MUST be recorded (refer to Management of Hazardous Chemicals Procedure Document No: 19). Assessments which identify that there is not a significant risk to health do not need to be recorded. It is sufficient to include a notation in the register to indicate that each step of the assessment has been done. This should include the date, the SDS or equivalent information that was reviewed and a notation that controls are in place.

Completed risk assessment forms should reflect the detail of the assessment. The risk assessment form should demonstrate sufficient information to show why decisions about risks and precautions were made.

Revision of Assessments

The assessment for a particular operation should be revised if:

- the process, plant or chemical is modified;
- new information on the hazards of the chemical becomes available;
- monitoring or health surveillance indicate inadequate exposure control; or
- new or improved control measures become reasonably practicable.

In any case, the assessment MUST be reviewed at least every seven years. A new assessment may not be required, particularly if the operation and degree of exposure to staff are similar to that initially assessed.

Length of Time Risk Assessment Forms MUST be Kept

Risk assessment forms indicating a need for monitoring and/or health surveillance MUST be retained by the employer for at least 30 years.

Risk assessment forms not indicating a need for monitoring and/or health surveillance MUST be retained by the school for at least seven years.

The time periods stated above are taken from the date of the last entry made in that risk assessment form or after it is superseded by a new risk assessment form.

All SDS's relating to the risk assessments MUST also be kept for the relevant time frame (either 30 or 7 years). This includes both the original SDS and all the updated SDS's.

Access to Risk Assessment Forms

Risk assessment forms should be readily accessible to all staff with potential for exposure to hazardous chemicals, staff representatives and relevant public authorities.

Consultation

Any new chemicals being introduced into the workplace or any proposed changes to the work environment or work processes MUST be discussed with staff. Principals MUST involve staff so that potential health and safety issues can be identified and resolved.

Staff have a good understanding of high-risk activities in their work areas. By setting up a communication system, where the principal and staff have a genuine opportunity to exchange views, informed decisions can be made based on shared information. Effective staff involvement and cooperation assist in preventing incidents, injuries and ill health.

Consultation involves not only giving information to staff but also listening and considering their opinions before making any health and safety decisions. It helps principals and staff to work together to seek solutions that lead to healthier and safer workplaces. Discussions should be recorded, meeting minutes can also be a substantive record of discussions undertaken.

Control

Principal's Duty to Prevent or Control Exposure

Principals MUST take action to prevent exposure to hazardous chemicals at work, or if that is not reasonably practicable, to ensure that exposure is adequately controlled so as to minimise risk to health.

For some hazardous chemicals, exposure standards have been set. These apply where a chemical is a contaminant in workplace air (e.g. as dust, fume or gas). The level of the hazardous chemical in workplace air, when monitored for an appropriate time period, MUST NOT exceed any relevant exposure standard. The exposure standards are listed on HSIS website. (<http://hsis.safeworkaustralia.gov.au/ExposureStandards>).

Adequate control means controlling exposure to as low a level as is reasonably practicable, whether there is an exposure standard or not. The aim is to minimise the health risk. If there is an exposure standard but it is reasonably practicable to control exposure below this level, then this should be done.

An important reason for keeping exposure as low as reasonably practicable is the possibility of staff being exposed to one or more different chemicals at the same time. The combined effects (synergism) of chemicals in mixtures can be more hazardous to health than the individual chemicals.

The methods used to control exposure to hazardous chemicals used in schools should be considered in the planning of any new workplace or modifications to an existing workplace. The cost of the control should be considered in the same way, and at the same time, as all other plant and process costs.

When considering methods to control exposure, all the possible routes of entry of the hazardous chemicals into the body should be taken into account.

Maintenance, Examination and Testing of Control Measures

The principal or delegated officer MUST ensure that all control measures perform as originally intended and continue to prevent or adequately control exposure of staff to hazardous chemicals

Where engineering control measures are used to control exposure, they should be thoroughly examined and tested at specified intervals to ensure effective performance.

Preventive servicing procedures should be established specifying which control measures require servicing, the servicing needed, the frequency of servicing, who is responsible, how any defects will be corrected, performance testing and evaluation standards, and records of servicing.

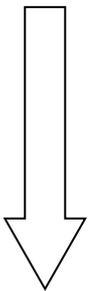
Hierarchy of Controls

When making decisions about appropriate control measures, the hierarchy of control measures should be applied in priority order.

This means that a hazardous chemical should be eliminated if that is practicable. If elimination is not reasonably practicable, then substitution should be considered. If substitution is not

reasonably practicable then the other control measures (isolation, engineering controls, safe work practices and personal protection) should each be considered in turn and applied as far as reasonably practicable, until exposure to the hazardous chemical is adequately controlled.

In so far as is reasonably practicable, the prevention or control of hazardous chemicals **MUST** be secured by measures other than the provision of personal protective equipment.

Strategy		Example
Elimination (best option)	MUST work down the hierarchy 	Using clips, clamps or bolts instead of adhesive.
Substitution		Replacing a chlorinated degreasing solvent with a detergent.
Isolation		Operation of spray painting equipment from outside the booth via remote.
Engineering		Ventilated booths for spray painting.
Administrative		Limit the use to authorized persons with adequate training and supervision. Prepare safe work procedures. Restrict usage to certain times or situations.
Personal Protective Equipment (last resort)		Used in conjunction with above strategies. Mandatory use of eye, hearing, respiratory protection. Includes training, maintenance, cleaning and storage
It may be necessary to use a combination of above measures		

Elimination

Where a work activity involves the use of a hazardous chemical that is not essential, the hazardous chemical should be eliminated wherever reasonably practicable. Examples of elimination include:

- using a physical process rather than a chemical process to clean an object, for example, use of ultra-sound;
- using clips, clamps or bolts instead of an adhesive; and
- purchasing supplies of a material in a ready-cut and sized form rather than carrying out dust-producing cutting processes on site.

Substitution

Substitution includes substituting a less hazardous chemical, the same chemical in a less hazardous form or the same chemical in a less hazardous process. Examples of substitution include:

- replacing a chlorinated degreasing solvent with a detergent;
- using a water-based paint in place of an organic solvent-based paint;
- using a chemical in paste or pellet form rather than a dusty powder; and brush application of paint rather than aerosol application.

Isolation

Isolation involves separation of the process from people by distance or the use of barriers to prevent exposure. Some examples of isolation controls are:

- operation of spray painting equipment from outside the booth via external control.

Fume Cupboards

Fume cupboards are normally provided where fumes from an experiment or procedure are constant or ongoing and may result in the build-up of contaminants within the immediate vicinity. There are many types of fume cupboards that have been available over the years, and changes of standards will have a bearing on the use, reuse or ultimate replacement of these cupboards. The types of materials used in the construction of fume cupboards also vary, and the condition of any particular fume cupboard will bear testament to their suitability.

The typical fume cupboard will include a sliding sash door that should be free moving and manufactured from minimum 6mm armour plated glass or equivalent. The entry velocity of air into the cupboard should be fairly constant through all openings.

Some older installations may have extraction fans situated inside the room or ceiling space. This situation should be avoided as this will mean that discharge ductwork is under pressure and may leak which could lead to the re-introduction of contaminants to the occupied space.

Some older style fume cupboards may contain asbestos products, which should be indicated on an asbestos register. In any upgrade of facilities, consideration should be given to their replacement. It is usually prohibitively expensive to try to upgrade older fume cupboards.

Make sure that the fume cupboard is regularly maintained and working efficiently

- Keep the interior of fume cupboards and nearby areas clean and clear
- Carry out work in fume cupboards if material is likely to give off toxic or unpleasant odours
- Keep fume cupboard sashes closed whenever practicable
- Do not place objects near fume cupboard baffles.

Provide

- Make-up air to account for all exhausted air from fume cupboards.
- External controls for gas and power to be used in the event of failure to isolate any problem.
- Air discharges with a velocity greater than 10m/s.
- Adequate lighting, which does not impede the flow of air within the cupboard.

Avoid

- Situating the fume cupboard where it may be affected by drafts from doorways, air conditioning outlets, and high traffic areas.
- Mechanical exhaust equipment located in the occupied space where exhaust air ductwork may become pressurized.
- Discharging air in the vicinity of outside air intakes.

Other Matters That Should be Considered

- lighting, which should be provided within the cupboard, **MUST** be encapsulated behind armour-plated glass without protrusion into the cupboard to avoid affecting the air patterns within, and **MUST** be sealed and spark-proof;
- controls for water, gas and electrical supplies **MUST** be located outside the cupboard for remote use by the operator without the need to open the sash door;
- provision should be made for isolation of gas and electrical supplies on failure of the ventilation systems with associated warning signals.

Operation

- Ensure that the system can operate on demand including make up ventilation.

For further information on fume cupboards, refer to AS/NZS 2243.8:2001 Safety in laboratories – fume cupboards.

Engineering

Engineering controls are plant or processes which minimise the generation of hazardous chemicals suppress or contain hazardous chemicals, or which limit the area of contamination in the event of spills or leaks. Types of engineering controls include enclosure or partial enclosure, local exhaust ventilation and automation of processes. Some examples of engineering controls are:

- ventilated booths for spray painting or fiber glassing;
- robot welding;
- local extraction systems attached to grinding machines;
- automation of the removal of objects from degreasing baths; and
- closed reaction vessels.

Housekeeping

- Regular cleaning of contamination from walls and surfaces.
- Providing means for safe storage and disposal of hazardous chemicals.
- Prohibiting eating, drinking and smoking in contaminated areas.
- Vacuuming dust from areas where cutting processes take place.
- Keeping lids on containers when not in use.
- Providing and using facilities for effective decontamination.
- Vacuum or wet sweep to suppress dust being generated.
- Clean up spills immediately (includes provision of suitable aids and equipment).
- Provide suitable washing facilities.
- Provide First Aid facilities.
- Keep floors tidy and dry.
- Keep benches clean and free from chemicals and equipment not being used.
- Keep aisles free from obstructions.
- Clearly label all containers in use within the teaching area.
- Clean working area and equipment thoroughly after use.

- If last to leave the work area make sure equipment is turned off, flames are extinguished, etc.
- Observe safety signs at all times.
- All laboratory apparatus left running overnight should be shielded and labeled with name and telephone number or notify security.
- If contractors are working in your area, make known to them any hazards which may exist in your area, i.e. flammable liquids.

Ventilation

Ventilation will provide an air change rate within the space to expel, dissipate or dilute the build-up of airborne contaminants.

Forced ventilation that mixes air within the space and provides more than 10 air changes per hour is considered sufficient ventilation in most cases.

Where only exhaust is provided at less than 10 air changes per hour it is recommended that exhaust is taken from both high and low level.

Where no air conditioning is provided, it is a requirement that adequate cross ventilation is provided to ensure the air quality is maintained. Opening windows on two sides of the room provides this. If the room is landlocked (i.e. cross ventilation cannot be provided) then alternate means of ventilation should be adopted such as a mechanical exhaust system. It should be noted that to ensure good ventilation with the space, windows MUST be open.

Noisy exhaust systems should be avoided. Systems MUST be quiet enough to allow operation whenever the areas are occupied.

Purpose of Ventilation

- To expel, dissipate or dilute harmful gaseous chemicals that may build up.
- To ensure good air quality is provided.
- To ensure replacement (make-up) air is provided where air is extracted.

The following MUST be provided:

- adequate ventilation to prevent the build-up of contaminants occurring within the room/area;
- a minimum of 10 air changes per hour in either exhaust or forced make-up air;
- exhaust or ventilation as near as possible to the source of contaminants;
- make-up air equivalent to any exhaust quantities.

The following MUST be avoided:

- systems which will not be used whenever the room/area is occupied;
- ventilation or exhaust systems that do not provide statutory outside air introduction;
- outside air introduction from the vicinity of exhaust air paths;
- reliance on windows for ventilation, especially where outside road or other noise makes it likely that windows will be left shut.

The purpose of air conditioning is to:

- ensure that good air quality is provided within occupied areas;
- provide an acceptable level of comfort when the activities occur within an occupied space.

Adequate ventilation and air quality should be considered to ensure the safety of occupants within a space. If air conditioning is provided it may be in the form of the following:

- evaporative cooling with gas or electric heating;
- ducted refrigerated cooling and heating;
- room air conditioners either wall or window mounted;
- reverse cycle systems in cassette or under-ceiling style;
- split air conditioning units where no vents are provided.

Each of the above systems condition and ventilate the space in different ways and it is imperative to understand what effect each of these systems has on the space.

Evaporative air conditioning will normally provide an air change rate superior to natural ventilation. This will result in good levels of air quality and, when operating, not require the use of other forms of exhaust. If these systems do not incorporate heating, it is likely that they will be shut down or not used in cooler months, which is effectively the same as not having the systems. In these cases window ventilation MUST apply.

Ducted air conditioning is normally designed in such a way as to comply with the requirements of adequate ventilation. It MUST provide the statutory amount of outside air to maintain air change rates to the room or area. Because these systems provide both heating and cooling and would be normally used at all times of occupancy, this will negate the need for other forms of ventilation. It is recommended that when designing these systems, an economy cycle be incorporated which can be used to flush out air during periods of high activity.

Both room and cassette style air conditioners are domestic in origin and do not normally provide the statutory amounts of outside air. These systems should only be used in conjunction with operable windows where adequate rates of ventilation can be achieved.

Air conditioning should provide:

- systems that can be operated whenever the room or area is used;
- make-up air to account for all exhausted air from any space. These may include general exhaust systems and fume cupboards. If fume cupboards rely on air conditioning systems for make-up air then alternative make-up MUST be provided when air conditioning systems are not operating.

Air conditioning should avoid:

- systems that interfere with air patterns around fume cupboards;
- systems that do not provide outside air introduction – for example many wall-mounted units;
- outside air intakes near exhaust air paths.
- Ensure that the system adopted for use is in fact used during all periods of occupancy.

Safety Shower and Eyewash Facilities

At least one safety shower and eyewash facility or eye/face wash facility **MUST** be installed in each laboratory where hazardous chemicals are used in accordance with AS/NZS2982.1. The safety shower and eyewash or eye/face wash facility **MUST** be capable of operation so that water flow remains constant without requiring the use of the operator's hands.

There **MUST** be no more than a 10 m travel distance to such devices from any point in the laboratory. These devices and their activating mechanisms **MUST** be located so that the approach to them is unobstructed.

Safety shower, eyewash and eye/face wash equipment **MUST** comply with AS 4775-2007 Emergency eyewash & shower equipment.

Emergency showers also known as drench or deluge showers, are designed to flush the user's head and body. They should not be used to flush the user's eyes because the high rate or pressure of water flow could damage the eyes in some instances.

Emergency showers can also be used effectively in extinguishing clothing fires or for flushing contaminants off clothing.

When installing a safety shower, unless existing building restrictions make it impossible, provide a shower waste connected to the drainage system for the emergency shower discharge. Placing showers in areas where natural drainage cannot be provided **MUST** be avoided.

The first 10 to 15 seconds after exposure to a chemical, especially a corrosive chemical, are critical. Delaying treatment, even for a few seconds, may cause serious injury.

Eyewash stations provide on-the-spot decontamination. They allow workers to flush away hazardous chemicals that can cause injury. Eyewash stations are designed to flush the eye and face area only.

It is recommended a minimum 20-minute flushing period if the nature of the contaminant is not known. "Flushing fluid" is defined as any of potable (drinking) water, preserved water, preserved buffered saline solution or other medically acceptable solutions.

The flushing or rinsing time can be modified if the identity and properties of the chemical are known. For example:

- a minimum 5-minute flushing time is recommended for mildly irritating chemicals;
- at least 20 minutes for moderate-to-severe irritants;
- 20 minutes for non-penetrating corrosives, and;
- at least 60 minutes for penetrating corrosives.

Non-penetrating corrosives are chemicals which react with human tissue to form a protective layer which limits the extent of damage. Most acids are non-penetrating corrosives. Penetrating corrosives, such as most alkalis, hydrofluoric acid and phenol, enter the skin or eyes deeply. Penetrating corrosives require longer water flushing (a minimum of 60 minutes) than non-penetrating corrosives (a minimum of 20 minutes).

In all cases, if irritation persists, repeat the flushing procedure. It is important to get medical attention as soon as possible after first aid has been given. A physician familiar with procedures for treating chemical contamination of the eyes and body should be consulted.

Personal Protective Equipment

In so far as is reasonably practicable, the prevention or adequate control of any exposure of an worker to a hazardous chemical **MUST** be achieved by measures other than the provision of personal protective equipment.

If other control measures do not prevent or provide adequate control of exposure of a staff member to a hazardous chemical, the principal or delegated officer **MUST** provide to the staff member, in addition to taking those measures, suitable personal protective equipment which will adequately control the staff members' exposure to the hazardous chemical.

Situations where use of suitable personal protective equipment may be necessary include:

- where it is not technically feasible to achieve adequate control by other means (in these cases, exposure MUST be reduced so far as is reasonably practicable by other measures and then, in addition, suitable personal protective equipment should be used to secure adequate control);
- where personal protective equipment is necessary to safeguard health until such time as adequate control is achieved by other means, for example, where urgent action is required because of plant failure; or
- during routine maintenance operations where the infrequency and small number of people involved may make other control measures impracticable.

Where personal protective equipment is used, staff MUST ensure that it is:

- properly selected for the individual and task;
- readily available;
- clean and functional;
- correctly used when required; and
- maintained by appropriately trained staff in accordance with a personal protective equipment maintenance and servicing program.

Examples of PPE:

- overalls, aprons, gowns, chemical resistant suits;
- footwear (enclosed shoes, safety boots);
- gloves – according to the requirements of the SDS;
- chemical resistant glasses (safety glasses);
- face shields/masks, respirators – full/partial;
- head protection.

Personal protective equipment should be selected and used in accordance with the relevant Australian Standards, in particular:

- eye protection should comply with AS1337 Eye Protection for Industrial Application and be selected and used in accordance with AS1336 Recommended Practices for Eye Protection in the Industrial Environment;
- respiratory protection should comply with AS1716 Respiratory Protective Device and be selected in accordance with AS1715 Selection, Use and Maintenance of Respiratory Protective Devices;
- hand protection should comply with AS2161 Industrial Safety Gloves and Mittens (Excluding Electrical and Medical Gloves);
- foot protection should comply with AS2210 Safety Footwear ;
- head protection should comply with AS1801 Industrial Safety Helmets and be used in accordance with AS1900 Selection, Care and Use of Industrial Safety Helmets; and
- clothing for protection against chemicals should comply with AS3765 Clothing for Protection against Hazardous Chemicals.

NB: items MUST be compatible with chemical(s) being used/stored.

4. Chemical Management

Purchasing

Hazardous chemicals are to be identified prior to the item being purchased. The supplier of the chemical **MUST** provide a safety data sheet prior to the first purchase of a chemical (except retail stores). Chemwatch may also be used to access safety data sheets. A risk assessment **MUST** be conducted prior to purchase.

A listing of approved chemicals can be found at [DECD Approved Hazardous Chemicals](#). If the chemical is classed as a hazardous chemical, the hierarchy of controls is to be considered in identifying appropriate solutions. Staff **MUST** be consulted at this purchasing stage.

Should a worker wish to purchase a hazardous chemical not on the DECD Approved List, they must complete a [Pre-Purchase Risk Assessment](#).

The following chemicals are banned from use in Catholic Schools:

Acetamide	Lauroyl Peroxide
Acetic Anhydride	Lithium metal
Ammonium Dichromate	Millon's Reagent
Antimony Chloride /Antimony Salts	Mercury II Oxide [and other Hg compounds other than Chloride and Nitrate]
Asbestos	Methylene Chloride
Benzaldehyde	Nickel Powder
Beryllium Compounds	Nitrobenzene
Bromoethane	Potassium Fluoride
Carbon Disulfide	Red Zinc Chromate
Carbon Tetrachloride	Sodium Fluoride
Chloroform	Toluene [toluol]
1,2-Dibromoethane [Ethylene dibromide]	1,1,1-trichloroethane
1,2 Dichloroethane [Ethylene dichloride]	Phosphorous red and yellow/white
Hydrofluoric Acid	Xylene

A comprehensive list of prohibited Carcinogens, restricted carcinogens and restricted hazardous chemicals can be found in the Code of Practice: Managing Risks of Hazardous Chemicals in the Workplace – Appendix C

Hazardous Chemicals Register

- A Hazardous Chemicals Register, **MUST** be developed and maintained for all hazardous chemicals. This **MUST** list all of the hazardous chemicals that are supplied to the workplace – these can be readily identified from labels and SDS.
- It **MUST** also be readily accessible to all personnel, and where applicable to contractors and emergency personnel.
- The register **MUST** also include hazardous chemicals produced at the workplace as products for supply to others, or as by-products, emissions and wastes.

Safety Data Sheets

A safety data sheet (SDS) **MUST** be provided by the supplier (except a retailer), for any hazardous chemical that is for use at work. SDS's may also be obtained from the Chemwatch database. This **MUST** be undertaken the first time a hazardous chemical is supplied to the purchaser, or if requested at any other time. A risk assessment **MUST** be conducted prior to purchase and the principal or delegated officer **MUST** ensure that the SDS is obtained from the supplier prior to the hazardous chemical being supplied to the workplace. Where practicable an alternative to a product classified as a hazardous chemical or dangerous good should be sourced.

On some occasions the PCBU may not be able to practicably obtain an SDS from the supplier, the SDS is obtained but the information is not complete, or supplementary information may be sought on the health hazard and precautions for safe use and handling. In this case the principal or delegated officer may choose to use information from a generic (or 'third party') SDS. By doing so the principal becomes accountable for any action taken as a result of that alternative information. Supplier SDS's can be obtained from the Chemwatch database.

Principals or delegated officers can also ask the supplier/manufacturer for additional information that will assist in the safe use of a hazardous Chemical.

The principal or delegated officer **MUST** make the SDS for a hazardous Chemical readily accessible to any staff who could be exposed to that hazardous Chemical. SDS should also be available to supervisors, emergency services personnel, health and safety representatives and committee members.

Access to SDS may be provided in a number of ways including:

- paper copy collections of SDS;
- readily accessible computerised SDS databases (Chemwatch).

In each case, the employer should ensure that:

- the current SDS are available (less than five years old);
- any storage or retrieval equipment is kept in good working order;
- workers are trained in how to access the information; and
- where information is displayed on a screen, there are means of obtaining a paper copy of that information.

What if the Supplier Will Not Provide a Safety Data Sheet?

There are four possible reasons why an SDS is not available for a Chemical:

- The Chemical has been determined not to be hazardous according to the GHS
- The Chemical is old stock, is no longer produced and no old SDS are available (or required)
- The Chemical is a mixture that contains hazardous Chemical(s) but the proportion is below the cut-off limit used to determine whether the mixture is hazardous
- The supplier is not complying with the law.

Any overseas SDS provided in Australia should include the relevant Australian information, for example, supplier contact details and any relevant exposure standard.

Labeling Hazardous Chemicals

What is a Label?

A label, for the purposes of the hazardous chemicals regulations and the Code of Practice: Labeling of Workplace Hazardous Chemicals, means a set of information on a container that identifies the Chemical in the container, identifies whether the Chemical is hazardous and provides basic information about the safe use and handling of the Chemical. The label is the first place to look for basic health and safety information.

What Should be on a Label?

This checklist will assist in ensuring that labels are prepared in accordance with the Code of Practice: Labelling of Workplace Hazardous Chemicals. The Code of Practice should be consulted for further information.

- Hazardous chemicals have specific labeling requirements.
- Original containers can be assumed to be labeled correctly.
- Appropriate labels for use when chemicals are decanted can be printed from ChemWatch, ChemGold II or other suitable programs.
- Labels on hazardous chemicals containing more than 500ml or 500g should contain:
 - a) signal word(s) and/or dangerous goods class label and subsidiary risk label(s);
 - b) product name, chemical name, United Nations number, other ingredients;
 - c) risk phrases;
 - d) directions for use;
 - e) safety phrases;
 - f) first aid procedures;
 - g) emergency procedures;
 - h) details of manufacturer or importer;
 - i) expiry date (where relevant);
 - j) reference to the Material Safety Data Sheet (SDS).

Containers that are designed to hold 500ml or 500g or less do not need quite so much information

Labelling on small containers

Where a hazardous chemical is packaged in a container that is too small to attach a label with information that is required of hazardous chemical labels in general, then the label must be written in English and include the following:

- the product identifier
- the name, Australian address and business telephone number of either the manufacturer or importer.
- A hazard pictogram or hazard statement that is consistent with the correct classification of the chemical, and
- Any other information required for hazardous chemicals labels in general that is reasonably practicable to include.

Where labelling the actual laboratory container is impractical due to its size or the conditions under which it is used, other methods of providing the information can be used. E.g. a secure swing tag, a sign attached to supporting apparatus or labelling an outer container. E.g. for a rack of test tubes, rather than label each individual test tube containing the same hazardous chemical, you may attach a label to the rack using a swing tag. It is necessary to remember that quality information in itself will not reduce risks; the information **MUST** be acted on.

The table below provides guidance on the orientation and size of label.

Container capacity	Minimum hazard pictogram dimensions	Minimum text size
≤ 500 mL	15 x 15 mm	2.5 mm
> 500 mL and ≤ 5 L	20 x 20 mm	3 mm
> 5 L and ≤ 25 L	50 x 50 mm	5 mm
≥ 25 L	100 x 100 mm	7 mm

Where Does the Label Come From?

Suppliers of hazardous chemicals to schools **MUST** ensure that any container that holds a hazardous chemical is appropriately labeled.

If a chemical is being produced in-house and placed in containers then the principal or delegated officer (usually the science teacher or laboratory assistant) **MUST** ensure that those containers are appropriately labeled. In this case the principal takes on the manufacturer's responsibility.

What if the Chemical is Poured into Another Container?

If a hazardous chemical is poured or decanted into another container it is probably for one of two purposes:

- the user wants to measure quantities or transfer the chemical to a third point immediately – in this case if the container is cleaned afterwards it does not need to be labeled
- the user wants to store a quantity of the hazardous chemical – in this case the new container will have to be labeled. The minimum requirement is that the new container **MUST** be labeled with the product name and relevant risk and safety phrases.

Labeling of Decanted Chemicals

Where a chemical is decanted at school, the type of labeling required will depend on whether the chemical is consumed immediately or over a longer period of time.

Where a decanted chemical is not consumed immediately, the principal or delegated officer **MUST** ensure that the container into which the chemical is decanted is labeled with the product name plus the risk and safety phrases in accordance with the Code of Practice for the Labeling of Workplace Hazardous Chemicals.

Where labeling is required but the container into which the chemical is decanted is very small, for example, a laboratory test tube, the label may be attached to the supporting apparatus, such as a test tube rack. Alternatively, a tag may be used to enable the required information to be provided.

Where a decanted chemical is consumed immediately, no labeling is required provided that the container is cleaned so that it no longer contains the chemical.

Unlabeled Containers

If a container of material is found without a proper label, for example the label is damaged, lost or unreadable, then the product name should be marked on the container.

If the contents of the container are not known, this should be clearly marked on the container, for example, 'Caution do not use: unknown Chemical'. Such a container should be stored in isolation until its contents can be identified and, if hazardous, the container is appropriately labeled. If the contents cannot be identified, they should be disposed of in an acceptable manner in consultation with the Environment Protection Authority (EPA).

If a staff member finds a container that does not have a label, the principal should be advised immediately.

Types of Chemicals

Listed below are details to assist in both identifying and safely handling the different types of dangerous goods.

Class 1 – Explosives



There are a number of classes of explosive, each of which indicates the level of explosiveness:

- 1.1 Explosives with a mass explosion hazard such as TNT, Gunpowder, Gelignite, etc.
- 1.2 Explosives which are a projectile or fragmentation hazard, but not a significant mass explosion hazard e.g. grenades, ammunition, etc.
- 1.3 Explosives which are a fire and minor blast hazard, with minor projectile or minor fragmentation hazards.
- 1.4 Explosives which are not a significant mass explosion hazard e.g. flares, fireworks, safety cartridges, etc.
- 1.5 Explosives with a mass explosion hazard, but are insensitive chemicals.
- 1.6 Chemicals which are a minor explosion hazard, very insensitive chemicals.

Examples of explosive chemicals are acetylides, azides, ozonides, and peroxides.

Peroxidisable chemicals such as ethers and alkenes, when stored for a long time, should be tested for peroxides before use.

Only sparkless "flammable storage" refrigerators should be used.

Wear appropriate protective clothing when handling.

Carry out the work in a well ventilated fume cupboard when handling toxic chemicals

Wash hands with water and detergent immediately after use.

Class 2 – Gases



- 2.1 Flammable gases
- 2.2 Non-flammable, non toxic gases
- 2.3 Toxic gases
- 2.4 Oxidizing gases

Class 3 - Flammable Liquids



Take special care when handling any amount of flammable solvents – do not place near electric sockets or near other potential ignition sources

Decant flammable liquids in fume cupboard.

Wash hands with water and detergent immediately after use.

Class 4 – Flammable Solids:



(chemicals liable to spontaneous combustion; chemicals that in contact with water emit flammable gases)

- 4.1 Flammable solids
- 4.2 Chemicals liable to spontaneous combustion
- 4.3 Chemicals that in contact with water emit flammable gases

Carry out the work in a well ventilated fume cupboard when handling toxic chemicals

Do not store in the heat/direct sunlight.

Wash hands with water and detergent immediately after use.

Class 5 – Oxidizing Chemicals; Organic Peroxides



5.1 Oxidizing chemicals

5.2 Organic peroxides

Oxidizing chemicals spontaneously evolve oxygen at room temperature or with slight heating or promote combustion. Strong oxidizers are capable of forming explosive mixtures when mixed with combustible, organic or easily oxidized materials

Chemicals that are likely to increase the risk and intensity of fire in other materials e.g. peroxides, chlorates, perchlorates, nitrates, and permanganates.

Wear appropriate protective clothing when handling e.g. eye protection, gloves, etc.

Wash hands with water and detergent immediately after use.

Class 6 – Toxic and Infectious Chemicals



6.1 – Toxic chemicals

6.2 – Infectious chemicals

Toxic chemicals may cause death or severe injury to human or animal health if swallowed, inhaled or by skin contact, examples - hydrogen cyanide and ammonia.

Make known to workers what toxic chemicals are used in the laboratory (refer to SDS).

Wear appropriate protective clothing when handling.

Carry out the work in a well ventilated fume cupboard when handling toxic chemicals.

Avoid weighing out these chemicals in a draughty area. Clean the area well after use.

Wash hands with water and detergent immediately after use.

Class 7 – Radioactive Materials



Prior to the use of any radioactive sources a risk assessment MUST be completed and control measures documented as part of the instructions for the practicals.

Storage and use of radioactive materials in schools MUST conform to the “Code of Practice for the Safe Use of Ionizing Radiation in Secondary Schools, National Health and Medical Research Council 1986 – <http://www.arpana.gov.au/pubs/rhs/rhs19.pdf>”.

The use of radioactive sources MUST be solely for the performance of simple experiments. The sources used and the methods of using them MUST be chosen to ensure that the degree of hazard is negligible.

Class 8 – Corrosive Chemicals



These chemicals may be identified by a Class 8 label, examples – Hydrochloric acid, Sulphuric acid

Always add concentrated acid to water not vice versa.

Open bottles of concentrated acids or ammonia solution in a ventilated fume cupboard.

Handle oxidizing chemicals with care.

Have spill kits readily available.

Wear appropriate protective clothing.

Wash hands with water and detergent immediately after use.

Class 9 – Miscellaneous Chemicals



Health Hazards



Chronic Health Hazards



Environment



Carcinogens

Make known to staff what toxic chemicals are used in the laboratory/school site (refer to SDS).

Wear appropriate protective clothing when handling.

Carry out the work in a well ventilated fume cupboard when handling toxic chemicals.

Avoid weighing out these chemicals in a draughty area. Clean the area well after use.

Wash hands with water and detergent immediately after use.

Equipment

Any person (including students) MUST be provided adequate information, instruction, training and supervision prior to operating equipment or undertaking any practical activity.

All apparatus/equipment used MUST be maintained in good condition and records kept.

- Electrical equipment MUST be tested and tagged as required and listed on the electrical testing register. For further information on electrical testing, tagging and registers refer to the [CCSM Document 9: Electrical](#). Faulty electrical equipment MUST be repaired by a qualified electrician. A certificate of compliance MUST be obtained and kept with the site records.
- Faulty electrical equipment which is not repairable MUST be immediately destroyed.
- Check equipment for cracks or damage prior to use.

Space

The size of any workplace should be appropriate for its intended use. When carrying out potentially hazardous activities overcrowded conditions MUST be avoided.

Class sizes MUST be risk assessed and consideration MUST be given to the available space, curriculum and the nature and maturity of the participants. Programs MUST be modified if necessary to minimize risk to health and safety e.g. for large classes a Teacher and an Assistant should be present.

Furniture, Layout and Ergonomics

All work areas (e.g. office, classroom, printing room, shed, workshop, laboratory) should be ergonomically suitable for its purpose and regularly checked for suitability and soundness.

Furniture and equipment in these areas should be arranged in a way that allows:

- adequate supervision of student activities;
- clear and easy access to and egress from work areas and activities, particularly in case of fire or other emergencies. Walkways MUST be kept clear;
- adequate space and ventilation for a safe working environment (e.g. large projects should not restrict movement);

- portable equipment (e.g. power tools, hand tools, glassware etc) should be placed away from traffic areas on trolleys or other stable surfaces;
- electrical cables MUST NOT obstruct walkways.

Safety Colour Codes and Signage

The following standard colours should be used for equipment, advisory signs, and physical hazards (AS1318—1985, “SAA Industrial Safety Colour Code”).

Safety Colour Code	
Red	Danger (Danger warning signage)
Yellow	Caution or attention (Hazards associated with equipment or an area)
Green	Safety (Safety shower/eyewash, first aid equipment, exit signs)
Blue	Information (Office, toilets, store)

Signage MUST comply with AS 1319—1994, “Safety signs for the occupational environment”; and as such should:

- identify hazardous chemical storage areas;
- clearly advise of restricted access;
- identify safety items such as fire extinguishers and first-aid kits, and services isolation valves and switches.

Safety signs should be placed on fixed surfaces, at eye level if possible, and in clearly visible locations.

Warning signs need to comprise the following elements:

- be located at positions so as to be able to be noticed by persons entering an area where hazardous chemicals are located;
- describe the hazardous property and nature of the hazard(s) of the hazardous chemicals at the location; (for example self-reactive flammable solid); (e.g. by using the class pictograms);
- describe the precautions necessary to prevent unintended initiation of an explosive, unintended ignition of a flammable chemical or unintended acceleration of fire, or unintended thermal decomposition involving an oxidizing chemical or organic peroxide; (e.g. “NO SMOKING “, “NO IGNITION SOURCES”);
- provide information to advise any of the trained persons and the emergency services provider(s) specified in the emergency response plan of the actions to be taken in an emergency, for the hazardous chemicals present (e.g. by using the HAZCHEM Code);
- be understandable and able to be easily read from a specific distance.

Transporting Chemicals

Avoid movement of chemicals within the school environment wherever possible, however when it is necessary to transport chemicals:

- conduct a risk assessment;
- choose times of low student movement;
- no students are to transport chemicals. They MUST be transported by qualified personnel;
- refer to SDS for safe handling instructions;

- use appropriate carriers, trays, trolleys, and separate incompatible chemicals;
- ensure all containers are labeled correctly;
- if PPE is required to handle these chemicals/chemicals it MUST be made available and used;
- ensure appropriate materials are available to deal with any spillage.

Personnel should not transport chemicals/chemicals in their own private vehicles unless a risk assessment has been conducted.

Hazardous chemicals must not be transported in a personnel lift. Should the use of a lift be required to move chemicals between floors, a documented risk assessment must be completed. The worksite must notify Catholic Safety Health and Welfare SA.

5 Administration Environment

Canteen Staff

Canteen staff MUST refer to the Home Economics section of this manual that covers the issues of cleaning agents and biohazards found in the food preparation and service industry.

Cleaners

Contracted cleaners MUST submit a register of any hazardous chemicals to be used and the procedures adopted in cleaning the site. If hazardous chemicals are stored on site, notification MUST be made about the type, quantity, place and method of storage.

Contractors

Schools often need specialized contractors for such things as building maintenance work. Schools therefore MUST develop and implement a policy that allows for the identification of any hazardous chemicals that may be brought onto the site and used as part of the contracted job. If a hazardous chemical is identified as part of the process the contractor MUST submit a Job Safety Analysis (JSA) that details the procedures and precautions taken in the use of the chemical(s) including removal of chemical waste.

Grounds and Building Maintenance

This is one of the higher risk areas due to the storage and use of a variety of chemicals. These may include solvents, petrol, paints, gas, fertilizers, weed killers, pesticides.

For use, storage and handling of chemicals in this environment staff MUST refer to the procedures as outlined under the Agricultural Studies and Technical Studies sections of this manual.

6 Agricultural Studies Environment

The area of Agricultural Studies may also include topics on Floriculture, Horticulture, Aquaculture and Viticulture. The use of chemicals in these areas in industry is substantial. Any schools having classes or activities involved in these pursuits and using chemicals as part of their processes, MUST make their practitioners aware of industry safety standards in relation to their area of activity.

Chemical Safety Equipment

The following safety equipment MUST be readily available where identified by a risk assessment as necessary.

Safety Items	Comments
Containers for storage and disposal of waste chemicals	Refer to the SDS for information regarding correct storage and disposal (in particular for fertilisers, weed killers, petrol, oils and other products used within the agricultural industry). Where required, a standard operating procedure may need to be written.
Exhaust Fans	A Exhaust Fans <u>MUST</u> be available and used in Agricultural Studies teaching and preparation areas for activities that generate dust and fumes. Exhaust Fans <u>MUST</u> comply with the requirements set down in section on Ventilation p. 23.
Fire blanket	Woolen or fiberglass, located near the exit door.
Fire extinguisher	<u>MUST</u> be placed near exit doors and outside of chemical storeroom.
First aid kit	Kits <u>MUST</u> comply with the Code of Practice: First Aid in the Workplace
Hazard labels	These <u>MUST</u> be displayed where appropriate to indicate chemical, biological, or electrical hazards.
Spill Kits	A chemical absorbing agent <u>MUST</u> be available where liquid chemicals are stored or used.
Telephone access	Emergency numbers should be permanently displayed nearby.
Trolley	These may be required for heavy items, or to transport equipment between areas. List trolleys on maintenance register for regular maintenance.

Personal Protective Equipment (PPE)

Personal Protective Equipment	Comments
Overalls – (Cotton drill)	Overalls or long pants and long sleeved shirt buttoned to the wrist <u>MUST</u> be worn when necessary. These items <u>MUST</u> be laundered regularly.
Fume/Mist/Dust protection	<p>In normal circumstances adequate protection is provided by use of an exhaust fan or placement of students within a naturally well ventilated work area. However in some circumstances (e.g. cleaning up spills) use of a respirator may be required (refer to relevant SDS for type of cartridge, and refer to manufacturer's instructions regarding storage and shelf life).</p> <p>In the case of using spray equipment the appropriate fume/mist protection mask or respirator <u>MUST</u> be used (refer to relevant SDS for type of cartridge, and refer to manufacturer's instructions regarding storage and shelf life).</p> <p>When moving, opening and using potting mixes, powdered or granulated fertilizers the instructions on the bags relating to dust/fume protection <u>MUST</u> be followed.</p>

Eye protection	Safety glasses (or goggles) with side shields or face shields. To be worn in all areas when handling liquids and also hazardous situations. Safety glasses, goggles, face shields require regular cleaning. Cleaning can be by washing in detergent solution.
Gloves	The appropriate hand ware MUST be worn when working with Fertilizers, Weed Killers, Potting Mixes and other chemicals that require this PPE on their SDS.

Cleaning/Housekeeping

All work areas **MUST** be cleaned regularly and thoroughly to reduce the possibility of chemical contamination.

- All sinks should be checked for obstructions and flushed regularly.
- Breakages, spills and excess waste **MUST** be cleaned up.
- Use warning signs as necessary.
- Scrap and waste etc **MUST** be placed in the appropriate bins.
- Spontaneously combustible chemicals and materials used with them should be immediately disposed of in accordance with the requirements of the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.
- Wet dusting is recommended to minimise air contamination.
- Workshop floors should be wet-mopped/hosed and/or vacuumed/swept regularly.
- Chemical-based cleaning materials and equipment are to be used and stored in accordance with product instructions.

Spillage

- Information to deal with chemical spillages can be accessed from the safety data sheets or from ChemWatch.
- Wet floor signs available and easily accessible
- Written procedures to deal with spillages **MUST** be available to all personnel working in Agricultural Studies areas and training provided for the implementation of these procedures. Records of all training **MUST** be kept.
- Adequate materials and equipment **MUST** be readily available for the control of spillage e.g. sand. Spilt materials **MUST** be handled and disposed of safely in accordance with the SDS.

When cleaning up spills:

- as advised by the SDS wear protective equipment such as gloves, etc;
- move leaking containers with care and if safe to do so transfer the contents to another container. Check the SDS on how to safely dispose of the chemical spill. If no information is available, check with the Environment Protection Authority.

Waste Disposal

- Environmentally safe practices, as described by the SDS, **MUST** be adopted for waste disposal.
- Liquid waste generated from class activities can in most cases be further diluted and flushed down the sink. [Sites where septic sewerage is connected should contact their local authority for guidelines].
- Excess acids and alkalis can be neutralized to within pH 6-10 then flushed down the sink.

- Flammable waste (oils, solvents, paints) **MUST NOT** be flushed down the sink. This waste **MUST** be stored for collection by an approved collection agency. Any waste chemical placed into containers for later disposal **MUST** be labeled correctly and appropriately stored.
- Hazardous chemicals **MUST NOT** be disposed of in the normal rubbish bins.
- Spontaneously combustible chemicals and materials used with them should be immediately disposed of in accordance with the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.

Ventilation and Air Quality

- Ventilation **MUST** be appropriate for the activities and the number of persons working in the area as identified by risk assessment. It **MUST** be sufficient to dispose of gases and fumes, and effectively circulate fresh air.
- Mechanical ventilation **MUST** conform to AS 1668.1 —1998, “The use of ventilation & air-conditioning in buildings. Part 1: Fire & smoke control in multicompartiment buildings. Part 2: Mechanical ventilation in buildings. Part 4: Natural ventilation in buildings”. Ensure mechanical ventilation units e.g. air conditioners, exhaust fans/ducting are listed on the site maintenance register.

Fume Extraction, Dust and Fume Control

- Dusts and fumes from a wide range of chemicals can cause respiratory complaints, skin allergies, or allergic sensitisation. Activities which generate fumes/vapours/mists or dusts (petrol, fertilizers, potting mixes), **MUST** be carried out with an exhaust fan operating or in a naturally ventilated area.
- Exhaust fans **MUST** be available and used where appropriate.
- Installation **MUST** comply with legislative requirements to ensure that extracted fumes do not pose a hazard for others at the worksite or within the general environment.
- Exhaust fans **MUST** be regularly serviced and records retained.

Gas/Air/Water

Agricultural Studies areas may have a supply of high pressure gas/air/water. Staff should be aware of hazards posed by high gas/air/water pressure. If high pressure water is used for emergency eye wash purposes it may cause eye damage.

For further information on emergency eye wash facilities refer to section 3 p26.

Gas Cylinders

All gas cylinders **MUST** be:

- stored in a well ventilated secure location away from excessive heat;
- securely supported using suitable racks, straps, chains or stands;
- transported and strapped to a cylinder cart;
- stored away from incompatible classes of gases.
- Gas cylinders must be less than 10 years old.

Storage

- Store hazardous chemicals in an area that is accessible only to authorised staff.
- Shelves and racks **MUST** be stable and either built-in or securely fixed to walls.

- Storage MUST suit the items being stored (e.g. sufficiently strong, large enough so that items do not protrude outside the storage area, and where appropriate shelves should have raised lips to store round objects that may roll).
- Items MUST be stored in a manner that makes them easily and safely accessible and should be stored at an appropriate height. Where items are stored above shoulder height, the use of an approved safety ladder is required. Ladders MUST comply with AS1892 Portable Ladders.
- Stored items MUST NOT extend over doorways or into walkways under any circumstances.
- Safe manual handling principles MUST be followed when designing and utilising storage areas.
- Trolleys should be available for the movement of bulky or heavy items. Ramps to storage areas may be required.
- Chemicals should be stored in a well ventilated secure area, with restricted access.
- Store the minimum quantity required to maintain the curriculum/activity.
- Particular categories of chemicals (e.g. oxidizers, dangerous when wet etc.) MUST be stored in the appropriate storage zone.
- Where possible, solids should be stored above liquids.
- Incompatible chemicals MUST NEVER be stored together.
- Storage cupboards, sheds and work areas need to be suitable for their purpose and MUST be maintained in good condition with particular attention to ventilation.
- Regularly inspect seals on containers and check for corrosion of shelf supports and door hinges.
- Storage cupboards MUST be labeled to identify the contents.

Storage of Flammable Chemicals

Flammable and combustible liquids, solids or gases will ignite when exposed to heat, sparks or flames. Petrol, solvents and some fertilizers (Yates Leaf Plus), have an extreme hazard alert for flammability. Check the SDS levels for flammability ratings and storage requirements.

Precautions to follow:

- minimise the quantity of flammable chemicals kept in the store;
- store and use flammable chemicals in well ventilated areas. Use exhaust fans or complete the task outdoors when working with chemicals that release flammable vapors;
- keep flammable chemicals away from ignition sources;

For more detailed information on the storage of flammable chemicals and hazardous chemicals in general consult the “South Australian [Dangerous Substances Regulations 2002](#)” which comes under the [Dangerous Substances Act 1979](#)

Section 41, “Keeping”, from the above Regulations reads:

- “(1) *For the purposes of section 14 of the Act, a person is permitted to keep any prescribed dangerous Chemical of Class 3 in any premises without a licence provided that the person complies with the provisions of this regulation.*
- (2) *A person may keep in any premises the following quantities of any prescribed dangerous Chemical of Class 3:*
- up to 120 litres of Class 3, Packing Group I or II provided that it is contained in packaging which has a capacity of not more than 60 litres;*
 - up to 1 200 litres of Class 3, Packing Group III;*

- (c) *up to 5 000 litres of Class 3, Packing Group I or II and up to 5 000 litres of Class 3, Packing Group III provided that the premises have an area of not less than two hectares and in or on which premises there is carried on a rural industry and that—*
 - (i) *any above ground storage is separated from protected works as defined in AS 1940 SAA Rules for the Storage and Handling of Flammable and Combustible Liquids and any part of the boundary of the land by not less than 15 metres; and*
 - (ii) *the area of ground around the storage is kept clear of combustible vegetation or refuse for a distance of not less than 3 metres;*
 - (d) *any quantity of Class 3, Packing Group I or II provided that it is contained in packaging which has a capacity not exceeding 5 litres and where the chemicals as packaged are manufactured products;*
 - (e) *any quantity of Class 3, Packing Group III provided that it is contained in packaging which has a capacity not exceeding 25 litres and where the chemicals as packaged are manufactured products.*
- (3) *If any flammable liquid is dispensed by retail sale from an underground tank in or on any licensed premises, the maximum quantity of flammable liquid which may be kept at the premises other than in any underground tank will be as is provided by Table 2.1 (relating to minor storage) of AS 1940.”*

To see how this is related to Class 3 chemicals held at your site look at the SDS and find the Class and the Packaging Group.

For example under this regulation the storage of petrol (Class 3, Packaging Group II) is limited to:

- up to 120 litres provided that it is contained in packaging which has a capacity of not more than 60 litres;
- up to 5 000 litres provided that the premises have an area of not less than two hectares and in or on which premises there is carried on a rural industry and that—
 - (i) any above ground storage is separated from protected works as defined in AS 1940 SAA Rules for the Storage and Handling of Flammable and Combustible Liquids and any part of the boundary of the land by not less than 15 metres; and
 - (ii) the area of ground around the storage is kept clear of combustible vegetation or refuse for a distance of not less than 3 metres;
- any quantity provided that it is contained in packaging which has a capacity not exceeding 5 litres and where the petrol as packaged is a manufactured product.

e.g. petrol – DG Class 3, PGII, can keep up to 120L without a licence. However must be kept in containers of maximum 2 x 60L (or smaller containers is permitted).

7 Art Environment

Artists, teachers and students might assume that all arts materials are safe, based on the simple fact that the materials are readily available. However, some of these materials can pose a hazard if the safety instructions set out on the product label are not followed. It is in the interests of all that the least hazardous products are used. There are many safer alternatives to the types of products used in the industry in general.

While it's impossible to list all of the potential hazards involved in every arts and crafts material or process, the following examples highlight some things that could be harmful if introduced into the teaching environment without due care. It is strongly recommended that you research and use the least hazardous materials available. The elimination of lead based paints and improvement in other products has reduced the level of hazardous materials in art related activities. There are many safe alternatives on the market.

Graphic Arts Media

The art supplies and chemicals associated with graphic media are often extremely hazardous. Depending on the type of art supplies used, artists can develop the same types of occupational diseases as industrial workers. Studies show that people who work with hazardous graphic media chemicals can develop dermatitis, lead poisoning, silicosis, liver and kidney damage, nerve damage, reproductive problems, carbon monoxide poisoning, cancer, and other ailments.

The risk of chemical hazards is directly linked to the following factors:

- Duration and frequency of exposure
- Chemical toxicity
- Chemical amount

Solvents. Solvents are used to dissolve oils, resins, varnishes, and inks. They are also used to remove paint and lacquer. Due to their common usage, solvents are one of the most underrated exposure hazards. Most organic solvents are poisonous if swallowed or inhaled in sufficient quantities. They also cause dermatitis (or skin inflammation) and narcosis (a numbing, drowsiness or unconsciousness).

Use the least toxic solvent possible. Denatured or isopropyl alcohol, acetone, and odorless mineral spirits are less toxic than solvents such as chloroform or ethylene.

Aerosol Sprays. Aerosol sprays, such as fixatives, paint sprays, and adhesive sprays, are extremely dangerous if someone inhales the fine mists produced by these products. Air brushes and spray guns are equally hazardous. Use aerosol sprays in a well-ventilated area and wear a dust/vapor mask to protect you from the hazardous vapors.

Acids and Alkalis. The acids and alkalis used in ceramics, photo chemicals, paint removers, and similar materials can be very caustic to the skin, eyes, respiratory system, and gastrointestinal system. Likewise the acids and alkalis used to etch metals and glass can be very dangerous. Strong acids, such as hydrochloric, sulfuric, and perchloric acid, require special handling as outlined in the SDS. Alkalis, such as caustic potash, caustic soda, quicklime, and unslaked lime, also require special treatment. Remember to add acid to water, not water to acid, when mixing chemicals.

Paints and Pigments. Many paints and color pigments contain hazardous chemical compounds. Lead paint, for example, is extremely dangerous, and should never be used in its powder form. Other paint components, such as chromate, cadmium, and cobalt pigments, are equally hazardous. Do not inhale powdered paint or spray paint vapors or accidentally ingest pigment by placing the brush tip in your mouth. In addition, do not eat, drink, or smoke while painting. Any of these activities could result in chronic poisoning.

The table below outlines common paint pigments and their hazardous chemical component:

Hazardous Chemical	Pigment (Paint Name)
Arsenic	<i>Emerald Green Cobalt Violet</i>
Antimony	<i>True Naples Yellow</i>
Cadmium	<i>All Cadmium Pigments</i>
Chromium	<i>Zinc Yellow Strontium Yellow Chrome Yellow</i>
Cobalt	<i>Cobalt Violet Cobalt Green Cobalt Yellow Cerulean Blue</i>
Lead	<i>Falk White Lead White Creminitz White Mixed White</i>
Manganese	<i>Manganese Blue Manganese Violet Burnt Umber Raw Umber Mars Brown</i>
Mercury	<i>Vermilion Cadmium Vermilion Red</i>

Photography.

Many of the chemicals used for photographic processing can cause severe skin and lung problems. The greatest hazards associated with photography include the preparation and use of concentrated chemical solutions. Never touch chemical powders or solutions with unprotected hands. In addition, take care not to stir up and inhale chemical dusts.

IMPORTANT:

Good ventilation is essential when working with photographic chemicals.

The following are common photographic agents and their hazards:

- Developer: May cause skin irritation and allergic reactions.
- Stop-bath: May cause burns and throat irritation.
- Fixer: Highly irritating to lungs.
- Intensifier: Very corrosive and may cause lung cancer.
- Reducer: Contact with heat, concentrated acids, or ultraviolet radiation produces poisonous gas.
- Toners: Highly toxic.
- Hardeners and stabilizers: Often contain formaldehyde which is poisonous, a skin irritant, and a known carcinogen.

Plastics, Acrylics, Epoxy Resins.

Plastic hazards result from making plastic and working with finished plastic. The greatest hazards associated with making plastic come from the monomers, solvents, fillers, catalysts, and hardeners that are commonly toxic. The hazards involved with finished plastics result

mainly from the methods used to work the plastic. For example, overheating or burning plastic produces toxic gases. Polishing, sanding, and sawing plastic produces harmful dusts.

Certain types of plastics, such as acrylics and epoxy resins are also hazardous. The components in acrylic, for example, include irritants, explosives, and flammables. The main hazard associated with acrylic compounds, however, is inhalation. Always maintain good ventilation when working with acrylic.

The epoxy resins used in laminating, casting, glues, and lacquer coatings, are also skin irritants, sensitizers, and suspected cancer-causing agents. Avoid skin contact and inhalation when working with epoxy resins.

Pottery and Ceramics.

Pottery clay contains silicates that can be hazardous if inhaled. Many low-fire clays and slip-casting clays also contain talc, which may be contaminated with asbestos. Long-term inhalation of asbestos can cause cancer and respiratory diseases. When mixing clay dust or breaking up dry grog, use exhaust ventilation and/or wear a toxic dust respirator. Work with wet clay when possible.

Pottery glazes also contain free silica, including flint, feldspar, and talc. Wear a toxic dust respirator when mixing or spraying glazes.

Toxic fumes and gases are often produced during the firing process. Ensure that all kilns are ventilated. In addition, use infrared goggles or a shield to look in the kiln peephole. Proper eye protection will help prevent cataracts.

Woodworking.

The hazards associated with woodworking include physical hazards, sawdust inhalation, exposure to toxic solvents and adhesives, and excessive noise from woodworking tools. Long term inhalation of sawdust can cause chronic respiratory diseases. Depending on the type of wood, short-term sawdust inhalation may also produce allergic reactions. Toxic preservatives, such as arsenic compounds and creosote, may cause cancer and reproductive problems. Epoxy resins and solvent-based adhesives also pose potential hazards. Use dust collectors around woodworking machines, ensure proper ventilation, and wear personal protective equipment, as appropriate.

Chemical Safety Equipment

The following safety equipment MUST be readily available where identified by a risk assessment as necessary.

Safety Items	Comments
Containers for storage and disposal of waste chemicals	Printers Inks, Photographic chemicals, Glazes, Plasters, used Linseed Oil, and other materials will each have storage and disposal requirements. Check these on your ChemGold II system or equivalent.
Exhaust Fans	An Exhaust Fans <u>MUST</u> be available and used in Art teaching and preparation areas for activities that generate dust and fumes. Exhaust Fans <u>MUST</u> comply with the requirements of AS 2243.8 - 2001. (requirements include siting, provision of services, design, airflow and maintenance). <i>For further information refer to the section on Ventilation p23.</i>
Fire blanket	Woolen or fiberglass, located near the exit door.
Fire extinguisher	<u>MUST</u> be placed near exit doors and outside of chemical storeroom.
First aid kit	Kits <u>MUST</u> comply with the Code of Practice: First Aid in the Workplace

Hazard labels	These <u>MUST</u> be displayed where appropriate to indicate chemical, biological, or electrical hazards.
Spill Kits	A chemical absorbing agent <u>MUST</u> be available where liquid chemicals are stored or used.
Telephone access	Emergency numbers should be permanently displayed nearby.
Trolley	These may be required for heavy items, or to transport equipment between areas. List trolleys on maintenance register for regular maintenance.

Personal Protective Equipment (PPE)

Personal Protective Equipment	Comments
Aprons	Aprons should be worn when necessary. These items <u>MUST</u> be laundered as needed (once per term, depending on use).
Fume protection	In normal circumstances adequate protection is provided by use of an exhaust fan. However in some circumstances (e.g. cleaning up spills) use of a respirator may be required (refer to relevant SDS for type of cartridge, and refer to manufacturer's instructions regarding storage and shelf life).
Eye protection	Safety glasses (or goggles) with side shields or face shields. To be worn in all areas when handling liquids and also hazardous situations. Safety glasses, goggles, face shields require regular cleaning. Cleaning can be by washing in detergent solution.
Gloves	Varied types of gloves may need to be worn dependent on the activity. Check the SDS for the appropriate PPE e.g. Kiln gloves.

Cleaning/Housekeeping

- All work surfaces MUST be cleaned regularly and thoroughly to reduce the possibility of chemical contamination.
- All sinks should be checked for obstructions and flushed regularly.
- Breakages, spills and excess waste MUST be cleaned up.
- Use warning signs as necessary.
- Scrap and waste etc MUST be placed in the appropriate bins.
- Spontaneously combustible chemicals and materials used with them should be immediately disposed of in accordance with the requirements of the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.
- Wet dusting is recommended to minimise air contamination.
- Floors should be wet-mopped and/or vacuumed/swept regularly.
- Chemical-based cleaning materials and equipment are to be used and stored in accordance with product instructions.

Spillage

- Information to deal with chemical spillages can be accessed from the SDS or from ChemWatch.
- Written procedures to deal with spillages MUST be available to all personnel working in Art areas and training provided for the implementation of these procedures. Records of all training MUST be kept.

- Adequate materials and equipment MUST be readily available for the control of spillage e.g. absorbent pillows. Spilt materials MUST be handled and disposed of safely in accordance with the SDS.

When cleaning up spills:

- as advised by the SDS wear protective equipment such as gloves, etc;
- move leaking containers with care and if safe to do so transfer the contents to another container. Wash residue down the sink with plenty of running water if it is safe to do so;

Waste Disposal

- Environmentally safe practices, as described by the SDS, MUST be adopted for waste disposal.
- Liquid waste generated from class activities can in most cases be further diluted and flushed down the sink. [Sites where septic sewerage is connected should contact their local authority for guidelines].
- Excess acids and alkalis can be neutralized to within pH 6-10 then flushed down the sink.
- Flammable waste (eg oils, solvents) MUST NOT be flushed down the sink. This waste MUST be stored for collection by an approved collection agency. Any waste Chemical placed into containers for later disposal MUST be labeled correctly and appropriately stored.
- Hazardous chemical chemicals MUST NOT be disposed of in the normal rubbish bins.
- Spontaneously combustible chemicals and materials used with them should be immediately disposed of in accordance with the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.

Ventilation and Air Quality

- Ventilation MUST be appropriate for the activities and the number of persons working in the area as identified by risk assessment. It MUST be sufficient to dispose of gases and fumes, and effectively circulate fresh air.
- Mechanical ventilation MUST conform to AS 1668—1998, “The use of ventilation & air-conditioning in buildings. Part 1: Fire & smoke control in multicompartment buildings. Part 2: Mechanical ventilation in buildings. Part 4: Natural ventilation in buildings. Ensure mechanical ventilation units e.g. air conditioners, exhaust fans/ducting are listed on the site maintenance register.

Fume Extraction

- Dusts and fumes from a wide range of chemicals can cause respiratory complaints, skin allergies, or allergic sensitisation. Activities which generate fumes/vapours/mists or dusts MUST be carried out with an exhaust fan operating.
- Exhaust fans MUST be available and used where appropriate.
- Installation MUST comply with legislative requirements to ensure that extracted fumes do not pose a hazard for others at the worksite or within the general environment.
- Exhaust fans MUST be regularly serviced and records retained.

Gas/Air

The Art area may have a supply of high pressure gas (kiln) and or air (air brush). Staff should be aware of hazards posed by high gas/air pressure.

Gas Cylinders

All gas cylinders MUST be:

- stored in a well ventilated secure location away from excessive heat;
- securely supported using suitable racks, straps, chains or stands;
- transported and strapped to a cylinder cart;
- stored away from incompatible classes of gases.
- Gas cylinders must be less than 10 years old.

Storage

- Store hazardous chemicals in an area that is accessible only to authorized staff.
- Shelves and racks MUST be stable and either built-in or securely fixed to walls.
- Storage MUST suit the items being stored (e.g. sufficiently strong, large enough so that items do not protrude outside the storage area, and where appropriate shelves should have raised lips to store round objects that may roll). Movable storage areas (including compactus units) MUST NOT be overloaded so as to create handling hazards.
- Items MUST be stored in a manner that makes them easily and safely accessible and should be stored at an appropriate height. Where items are stored above shoulder height, the use of an approved safety ladder is required. Ladders MUST comply with AS1892 Portable Ladders.
- Stored items MUST NOT extend over doorways or into walkways under any circumstances.
- Safe manual handling principles MUST be followed when designing and utilising storage areas.
- Trolleys should be available for the movement of bulky or heavy items. Ramps to storage areas may be required.
- Chemicals should be stored in a well ventilated secure area, with restricted access.
- Store the minimum quantity required to maintain the curriculum.
- Particular categories of chemicals (e.g. oxidizers, dangerous when wet etc.) MUST be stored in the appropriate storage zone.
- Where possible, solids should be stored above liquids.
- General shelf chemicals can be organized in a format which suits the individual site function.
- Chemicals that fall into the Flammable, Corrosive, Oxidising Agent, Dangerous When Wet, and Spontaneously Combustible categories MUST be stored in the correct segregated storage zones.
- Incompatible chemicals MUST NEVER be stored together.
- Storage cupboards need to be suitable for their purpose and MUST be maintained in good condition with particular attention to ventilation.
- Regularly inspect seals and check for corrosion of shelf supports and door hinges.

- Storage cupboards MUST be labeled to identify the contents.

Storage of Flammable Chemicals

Flammable and combustible liquids, solids or gases will ignite when exposed to heat, sparks or flames. Precautions to follow:

- minimise the quantity of flammable chemicals kept in the Art room;
- store and use flammable chemicals in well ventilated areas. Use exhaust fans when working with chemicals that release flammable vapors;
- keep flammable chemicals away from ignition sources;
- except for quantities needed at hand keep flammable chemicals in a flammables cabinet that is compliant with AS1940.

Where the total quantity of flammable chemicals stored in a work area exceeds any of the table below for Class 3 chemicals:

- Packing Group I or 11 – 50 L per 50 m² of floor space
- Packing Group III – 100 L pr 50 m² of floor space
- Combustible Class 1 & 2 (total) 200 L

it is a legal requirement to keep them in a flammables cabinet, which MUST:

- be vented to the outside;
- be located away from heat sources;
- be labeled with appropriate signage;
- have solids stored above liquids;
- not have chemicals stored in the drip trays.

8 Home Economics Environment

There are a number of chemicals with which students and staff may come into contact within this environment. These can be categorised as follows, cleaning agents, cooking agents, ingredients and biohazards.

Cleaning Agents

Contact with some of these agents can result in adverse health effects such as burns, irritation to the eyes, nose and throat, skin problems such as dermatitis and respiratory problems such as asthma.

Some of the cleaning chemicals that food service workers commonly use are listed below with their possible health effects. (Read the label on your product to check the chemical ingredients).

Product	Chemical Ingredients	Potential health effects
Oven Cleaners	sodium hydroxide(caustic soda); ethanolamine; diethylene glycol;	Eye, skin and respiratory tract irritation Skin burns from concentrated solution Dermatitis from repeated contact
Floor Cleaners and Dishwasher Soap	quarternary ammoniums alkaline salts ;	Skin burns Dermatitis Corrosive irritation to eyes, respiratory tract and skin
Degreasers	various organic solvents	Eye, skin and respiratory tract irritation Headaches, nausea and dizziness
Bleach	sodium hypochlorite(can release chlorine gas)	Eye, skin and respiratory tract irritation Burns Skin allergy Gas is severe irritant

What Action Can be Taken?

Teachers **MUST** be actively involved in making sure that they and their students are protected:

- Ask or enquire about any health effects from the chemicals you use.
- Read the label on the container and follow any safety precautions.
- Get a Safety Data Sheet (SDS) on the product - schools should store SDS for all products in a register and make it available to all workers.
- Store all products according to instructions and seal containers when not in use.
- Dispose of all empty containers of products properly.
- Ensure that there is good ventilation in the area that the product is used. Windows may need to be kept open for natural ventilation or an extraction fan may be needed to remove fumes.

- Ensure that suitable training or advice on how to use, store, handle, dispose of the product used is provided.
- Use any personal protective equipment such as gloves, masks, goggles or aprons if needed - make sure that they are the proper type and fit to provide effective protection. If you have any concerns about the products you use at work you should contact the principal or delegated officer.

Chemical Safety Equipment

The following safety equipment **MUST** be readily available where identified by a risk assessment as necessary.

Safety Items	Comments
Containers for storage and disposal of waste chemicals	Consult the SDS for correct storage and recycling and or disposal of used cooking oil.
Exhaust Fans	A Exhaust Fans MUST be available and used in Home Economics teaching and preparation areas for activities that generate heat and fumes. <i>For further information refer to section 3 "Ventilation"pp22, 23.</i>
Fire blanket	Woolen or fiberglass, sited near exit door.
Fire extinguisher	MUST be placed near exit doors and outside of chemical storeroom.
First aid kit	Kits MUST comply with the Code of Practice: First Aid in the Workplace
Hazard labels	These MUST be displayed where appropriate to indicate chemical, biological, electrical or radiation hazards.
Spill Kits	A risk assessment must be conducted to determine contents of spill kit required.
Telephone access	Emergency numbers should be permanently displayed nearby.
Trolley	These may be required for heavy items, or to transport equipment between areas. List trolleys on maintenance register for regular maintenance.

Personal Protective Equipment (PPE)

Personal Protective Equipment	Comments
Aprons	Aprons should be worn when necessary. These items MUST be laundered as needed (once per term, depending on use).
Fume protection	In normal circumstances adequate protection is provided by use of an exhaust fan. However in some circumstances (e.g. cleaning up spills) use of a respirator may be required (refer to relevant SDS for type of cartridge, and refer to manufacturer's instructions regarding storage and shelf life).
Gloves	Activities vary from protection from heat, cleaning agents and irritants. Be aware of the type of protection needed and use the appropriate hand protection.

Cleaning/Housekeeping

- All benches MUST be cleaned regularly and thoroughly to reduce the possibility of chemical and biological contamination.
- All sinks should be checked for obstructions and flushed regularly.
- Breakages, spills and excess waste MUST be cleaned up.
- Use warning signs as necessary.
- Scrap and waste etc MUST be placed in the appropriate bins.
- Wet dusting is recommended to minimise air contamination.
- Floors should be wet-mopped and/or vacuumed/swept regularly.
- Chemical-based cleaning materials and equipment are to be used and stored in accordance with product instructions.

Spillage

- Information to deal with the spillage of cleaning agents and oils can be accessed from the material safety data sheets or from ChemWatch.
- Written procedures to deal with spillages MUST be available to all personnel working in Home Economics areas and training provided for the implementation of these procedures. Records of all training MUST be kept.
- Adequate materials and equipment MUST be readily available for the control of spillage. Spilt materials MUST be handled and disposed of safely in accordance with the SDS.

Waste Disposal

- Environmentally safe practices, as described by the SDS, MUST be adopted for waste disposal of cleaning agents, oils, and biohazards.
- Liquid waste generated from class activities can in most cases be further diluted and flushed down the sink. [Sites where septic sewerage is connected should contact their local authority for guidelines].
- Flammable waste (eg oils) MUST NOT be flushed down the sink. This waste MUST be stored for collection by an approved collection agency. Any waste Chemical placed into containers for later disposal MUST be labeled correctly and appropriately stored.
- Disposal of food scraps must be in accordance with food handling standards.

Ventilation and Air Quality

- Ventilation MUST be appropriate for the activities and the number of persons working in the area as identified by risk assessment. It MUST be sufficient to dispose of gases and fumes, and effectively circulate fresh air.
- Mechanical ventilation MUST conform to AS 1668—1991, “The use of mechanical ventilation and air-conditioning in buildings”. Ensure mechanical ventilation units e.g. air conditioners, exhaust fans/ducting are listed on the site maintenance register.

Fume Extraction

Dusts and fumes from a wide range of chemicals can cause respiratory complaints, skin allergies, or allergic sensitisation. Activities which generate fumes/vapours/mists or dusts (flour), MUST be carried out with an exhaust fan operating.

- Exhaust fans MUST be available and used where appropriate.
- Installation MUST comply with legislative requirements to ensure that extracted fumes do not pose a hazard for others at the worksite or within the general environment.
- Exhaust fans MUST be regularly serviced and records retained.

Gas

Home Economics areas often have a supply of high pressure gas. Staff should be aware of hazards posed by high gas pressure. Emergency gas shut off valves should be installed.

Gas Cylinders

All gas cylinders MUST be:

- stored in a well ventilated secure location away from excessive heat;
- securely supported using suitable racks, straps, chains or stands;
- transported and strapped to a cylinder cart;
- stored away from incompatible classes of gases;
- Gas cylinders must be less than 10 years old.

Storage

- Store hazardous cleaning chemicals in an area that is accessible only to authorized staff.
- Store cooking ingredients in an area that is accessible only to authorized staff or students under supervision.
- Food and chemicals MUST NOT be stored together.
- Shelves and racks MUST be stable and either built-in or securely fixed to walls.
- Storage MUST suit the items being stored (e.g. sufficiently strong, large enough so that items do not protrude outside the storage area, and where appropriate shelves should have raised lips to store round objects that may roll). Movable storage areas (including compactus units) MUST NOT be overloaded so as to create handling hazards.
- Items MUST be stored in a manner that makes them easily and safely accessible and should be stored at an appropriate height. Where items are stored above shoulder height, the use of an approved safety ladder is required. Ladders MUST comply with AS1892 Portable Ladders.
- Stored items MUST NOT extend over doorways or into walkways under any circumstances.
- Safe manual handling principles MUST be followed when designing and utilising storage areas.
- Trolleys should be available for the movement of bulky or heavy items. Ramps to storage areas may be required.
- Store the minimum quantity required to maintain the curriculum.
- Where possible, solids should be stored above liquids.

- Incompatible chemicals MUST NEVER be stored together.
- Storage cupboards need to be suitable for their purpose and MUST be maintained in good condition with particular attention to ventilation.
- Regularly inspect seals and check for corrosion of shelf supports and door hinges.
- Storage cupboards MUST be labeled to identify the contents.

Storage of Flammable Chemicals

Flammable and combustible liquids, solids or gases will ignite when exposed to heat, sparks or flames. Precautions to follow:

- minimise the quantity of flammable chemicals kept in the kitchen;
- store and use flammable chemicals in well ventilated areas. Use exhaust fans when working with chemicals that release flammable vapors.

9 Science Laboratory Environment

Before dealing specifically with chemicals within this environment it is important to note that sections 2, 3 and 4 reinforce the notion that a well thought out work environment can only increase safety when dealing with hazardous materials.

Safety Equipment

The following safety equipment MUST be readily available where identified by a risk assessment as necessary.

Safety Items	Comments
Containers for storage and disposal of waste chemicals	Chemical wastes unsuitable for disposal in the sink or normal rubbish (e.g. organic solvents, heavy metal salts etc) <u>MUST</u> be collected in a suitably labeled container pending correct disposal.
Eyewash stations	These <u>MUST</u> be available in all Science areas where chemicals are stored or used. They <u>MUST</u> be fitted with low-pressure nozzles. (Fixed or portable options available). Include testing requirements. <i>For further information refer to Section 3 p25.</i>
Fire blanket	Woolen or fiberglass, sited near exit door.
Fire extinguisher	<u>MUST</u> be placed near exit doors and outside of chemical storeroom.
First aid kit	Kits <u>MUST</u> comply with the Code of Practice: First Aid in the Workplace
Fume Cupboard	A fume cupboard <u>MUST</u> be available and used in Science teaching and preparation areas for activities that generate fumes and dusts. Fume cupboards <u>MUST</u> comply with the requirements of Australian Standard 2243.8 (requirements include siting, provision of services, design, airflow and maintenance). <i>For further information refer to section 3 p24.</i>
Hazard labels	These <u>MUST</u> be displayed where appropriate to indicate chemical, biological, electrical or radiation hazards.
Mercury absorption materials	Mercury spill kit or mercury decontaminant powder <u>MUST</u> be available where mercury (including mercury thermometers) is used. Mercury spills <u>MUST</u> be promptly cleaned up, and residues stored in a sealed container for correct disposal.
Pipette bulbs or pipumps	To be used for all pipetting. Pipetting <u>MUST</u> not be done by mouth.
Safety Shield (screen)	To be used for demonstrations involving vigorous chemical reactions.
Safety shower	A safety shower <u>MUST</u> be accessible in Science areas where chemicals are stored or used. <i>For further information refer to section 3 p25.</i>
Sharps disposal	Contaminated sharp items (e.g. used scalpel blades, broken glass, used pipettes) <u>MUST</u> be disposed of in an appropriate labeled and sealed container.
Spill Kits	A risk assessment must be completed to determine what contents are required in the spill kit. Chemical absorbent pillows or chemical absorbing agent <u>MUST</u> be available where liquid chemicals are stored or used.
Telephone access	Emergency numbers should be permanently displayed nearby.
Trolley	These may be required for heavy items, or to transport equipment between areas. List trolleys on maintenance register for regular maintenance.
Winchester carrier	Winchester carriers are recommended for the handling of large bottles of corrosives.

Personal Protective Equipment (PPE)

Personal Protective Equipment	Comments
Aprons and/ or Laboratory Coats	Laboratory coats should be worn when necessary. These items <u>MUST</u> be laundered as needed (once per term, depending on use).
Dust and fume protection	In normal circumstances adequate protection is provided by use of a fume cupboard. However in some circumstances (e.g. cleaning up spills) use of a respirator may be required (refer to relevant SDS for type of cartridge, and refer to manufacturer's instructions regarding storage and shelf life). Gauze masks should be made available for activities generating dust.
Eye protection	Safety glasses (or goggles) with side shields or face shields. To be worn in all areas when handling liquids and also hazardous situations. Safety glasses, goggles, face shields require regular cleaning. Cleaning can be by washing in detergent solution.
Gloves	Latex or polythene gloves are required for the handling of biological materials. PVC or Nitrile gloves suit handling of most chemicals. Leather gloves suit the handling of cryogenic or hot materials. Cotton gloves are required when using glue guns.

Cleaning/Housekeeping

- All benches MUST be cleaned regularly and thoroughly to reduce the possibility of chemical contamination.
- All sinks should be checked for obstructions and flushed regularly.
- Breakages, spills and excess waste MUST be cleaned up.
- Use warning signs as necessary.
- Scrap, waste and dusts etc MUST be placed in the appropriate bins.
- Spontaneously combustible chemicals and materials used with them should be immediately disposed of in accordance with the requirements of the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.
- Wet dusting is recommended to minimise air contamination.
- Floors should be wet-mopped and/or vacuumed/swept regularly.
- Chemical-based cleaning materials and equipment are to be used and stored in accordance with product instructions.

Spillage

- Information to deal with chemical spillages can be accessed from the SDS or from ChemWatch.
- Written procedures to deal with spillages MUST be available to all personnel working in science areas and training provided for the implementation of these procedures. Records of all training MUST be kept.
- Adequate materials and equipment MUST be readily available for the control of spillage e.g. absorbent pillows. Spilt materials MUST be handled and disposed of safely in accordance with the SDS.

When cleaning up spills:

- as advised by the SDS wear protective equipment such as gloves, safety glasses, face shield, lab coat;
- move leaking containers with care and if safe to do so transfer the contents to another container. Wash residue down the sink with plenty of running water if it is safe to do so;
- mercury spills are to be cleaned up using a Mercury spill kit;

Spill Kits

The majority of laboratory chemical spills can be cleaned up by workers. In order to facilitate the efficient clean up of these spills, a spill kit **MUST** be readily available where chemicals are used. Training is still required in order to use the spill kit.

After the use of a spill kit, a hazard report **MUST** be completed and the kit restocked. A basic chemical spill kit should include but is not limited to:

- Latex surgical gloves
- Safety glasses or goggles
- Mask
- Disposable coats
- Aprons or gowns
- Paper towels
- Spill booms or pillows
- Vermiculite
- Small disposable plastic broom and dust pan
- Zipper seal type bags (3 litre size)
- Plastic garbage bags
- Small bottle of detergent cleaning solution
- Shoe Covers
- Copy of Chemical Spill Clean up Plan
- Store in a 20 litre bucket with a lid

Waste Disposal

- Environmentally safe practices, as described by the SDS, **MUST** be adopted for waste disposal.
- Sharps e.g. razor blade, scalpels, needles, **MUST** be disposed of in a sealed puncture proof container or approved sharps container.
- Liquid waste generated from class activities can in most cases be further diluted and flushed down the sink. [Sites where septic sewerage is connected should contact their local authority for guidelines].
- Excess acids and alkalis can be neutralized to within pH 6-10 then flushed down the sink.

- Organic and flammable waste **MUST NOT** be flushed down the sink. They **MUST** be stored for collection by an approved collection agency. Any waste chemical placed into containers for later disposal **MUST** be labeled correctly and appropriately stored.
- Hazardous chemicals **MUST NOT** be disposed of in the normal rubbish bins.
- Spontaneously combustible chemicals and materials used with them should be immediately disposed of in accordance with the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.

Ventilation and Air Quality

- Ventilation **MUST** be appropriate for the activities and the number of persons working in the area as identified by risk assessment. It **MUST** be sufficient to dispose of gases and fumes, and effectively circulate fresh air.
- Mechanical ventilation **MUST** conform to AS 1668—1998, “The use of ventilation & air-conditioning in buildings. Part 1: Fire & smoke control in multicompartiment buildings. Part 2: Mechanical ventilation in buildings. Part 4: Natural ventilation in buildings. Ensure mechanical ventilation units e.g. air conditioners, exhaust fans/ducting, fume cupboards, and are listed on the site maintenance register.

Fume Extraction, Dust and Fume Control

- Dusts and fumes from a wide range of chemicals can cause respiratory complaints, skin allergies, or allergic sensitisation. Activities which generate fumes/vapours/mists or dusts, **MUST** be carried out in a fume cupboard.
- Fume cupboards **MUST** be available and used where appropriate.
- Only materials being used in an ongoing experiment should be kept in the fume hood. Cluttering the hood will create air flow disturbances.
- Fume cupboards **MUST** comply with AS 2243.8, particularly in aspects such as construction, positioning, performance and inspection.
- Installation **MUST** comply with legislative requirements to ensure that extracted fumes do not pose a hazard for others at the worksite or within the general environment.
- Fume cupboards **MUST** be regularly serviced and records retained (annual inspections).

Water

Science areas **MUST** have a ready supply of water. Staff should be aware of hazards posed by high water pressure. If used for emergency eye wash purposes it may cause eye damage.

Gas Cylinders

All gas cylinders **MUST** be:

- stored in a well ventilated secure location away from excessive heat;
- securely supported using suitable racks, straps, chains or stands;
- transported and strapped to a cylinder cart;
- stored away from incompatible classes of gases;
- gas cylinders must be less than 10 years old.

Biological

Biological materials may pose a risk to staff and students. Hazards may include viruses and bacteria and the risks include infection and disease.

A risk assessment MUST be conducted prior to the use of biological materials, and all appropriate control measures implemented. Control measures may include:

- correct procedures for handling biological material
- use of universal precautions, wearing gloves whenever handling biological material;
- restricting the study of moulds to the use of food based mediums such as bread, cheese, etc. Mould spores may trigger an asthma attack;
- only conduct experiments involving blood using samples from the Australian Red Cross;
- keep hands away from face when working with biological materials;
- keep benches free of contaminants.

Schools visits to abattoirs or other slaughtering works are not permitted.

Cultures and microbiological specimens MUST be sterilized before disposal.

Dispose of sharps such as used scalpel blades in a sealed sharps container.

Safety Showers and Eyewash Facilities.

At least one safety shower and eyewash facility or eye/face wash facility shall be installed in each laboratory where hazardous chemicals are used in accordance with AS/NZS2982.1. The safety shower and eyewash or eye/face wash facility shall be capable of operation so that water flow remains constant without requiring the use of the operator's hands.

There shall be no more than a 10 m travel distance to such devices from any point in the laboratory. These devices and their activating mechanisms shall be located so that the approach to them is unobstructed.

Safety shower, eyewash and eye/face wash equipment shall comply with ANSI Z358.1 Design installation provisions for emergency safety shower, eyewash and eye/face equipment.

Safety showers, eye wash facilities must be checked on a regular basis. It is recommended they are checked monthly and records retained. Refer to CCSM Document 19: Management of Hazardous Chemicals.

For further information on these facilities refer to Section 3 p25.

Storage

- Store hazardous chemicals in an area that is accessible only to authorized laboratory staff.
- Shelves and racks MUST be stable and either built-in or securely fixed to walls.
- Storage MUST suit the items being stored (e.g. sufficiently strong, large enough so that items do not protrude outside the storage area, and where appropriate shelves should have raised lips to store round objects that may roll). Movable storage areas (including compactus units) MUST NOT be overloaded so as to create handling hazards.
- Items MUST be stored in a manner that makes them easily and safely accessible and should be stored at an appropriate height. Where items are stored above shoulder height, the use of an approved safety ladder is required. Ladders MUST comply with AS1892 Portable Ladders.

- Stored items MUST NOT extend over doorways or into walkways under any circumstances.
- Safe manual handling principles MUST be followed when designing and utilising storage areas.
- Trolleys should be available for the movement of bulky or heavy items. Ramps to storage areas may be required.
- Chemicals should be stored in a well ventilated secure area, with restricted access.
- Store the minimum quantity required to maintain the curriculum.
- Particular categories of chemicals (e.g. oxidizers, dangerous when wet etc.) MUST be stored in the appropriate storage zone.
- Where possible, solids should be stored above liquids.
- General shelf chemicals can be organized in a format which suits the individual site function.
- Chemicals that fall into the Flammable, Corrosive, Oxidising Agent, Dangerous When Wet, and Spontaneously Combustible categories MUST be stored in the correct segregated storage zones.
- Incompatible chemicals MUST NEVER be stored together.
- Storage cupboards need to be suitable for their purpose and MUST be maintained in good condition with particular attention to ventilation.
- Regularly inspect seals and check for corrosion of shelf supports and door hinges.
- Storage cupboards MUST be labeled to identify the contents.

Storage of Flammable Chemicals

Flammable and combustible liquids, solids or gases will ignite when exposed to heat, sparks or flames. Precautions to follow:

- minimise the quantity of flammable chemicals kept in the laboratory;
- store and use flammable chemicals in well ventilated areas. Use a fume hood when working with chemicals that release flammable vapors;
- keep flammable chemicals away from ignition sources;
- except for quantities needed at hand keep flammable chemicals in a flammables cabinet that is compliant with AS1940.

Where the total quantity of flammable chemicals stored in a laboratory exceeds any of the table below for Class 3 chemicals:

- Packing Group I or II – 50 L per 50 m² of floor space
- Packing Group III – 100 L per 50 m² of floor space
- Combustible Class 1 & 2 (total) 200 L

it is a legal requirement to keep them in a flammables cabinet, which MUST:

- be vented to the outside;
- be located away from heat sources;
- be labeled with appropriate signage;
- have solids stored above liquids;
- not have chemicals stored in the drip trays.

Flammable Solids [Class 4.1] (store above liquids)

Aluminum Powder	Magnesium Ribbon	Polystyrene Granules
Camphor	Magnesium Powder	Sulfur Flowers
Hexamine	Manganese Powder	Silicon Powder
Lycopodium Powder	Naphthalene Flakes	Styrene monomer

Flammable Liquids [Class 3]

Acetone	Ethanol - Absolute	2-Methyl Propan-2-ol (iso Butanol)
Alcohol (ethanol) Dehydrated	Ethyl Acetate	Methylated Spirits
Amyl Acetate	Ethyl Butyrate	Mineral Turpentine [Thinners]
Amyl Alcohol	Formaldehyde [Methanal]	Octane
Butan-1-ol	Heptane	Pentan-1-ol [Amyl Alcohol]
Butan-2-ol	Hexamine	Pentan-2-ol
tert Butyl Chloride	Hexane	Petroleum Crude
1-Bromobutane	Hexan-1ol	Petroleum Spirit
2-Bromobutane	1-Iodobutane	Phloroglucinol sol (in Ethanol)
2-Bromo-2-Methylpropane	Kerosene	Propan-1-ol
2-Chloro-2-Methylpropane	Leishmans's Stain	Propan-2-ol
Chlorobenzene	Lubricating Oil	Propionaldehyde
1-Chlorobutane	Methanol	Rose Water
Cyclohexane	Methyl Methacrylate	Universal Indicator
Cyclohexene	Methyl Propan-1-ol	White Spirits
Dichloromethane	3-Methyl-1-butanol (Iso Amyl Alcohol)	Xanthydrol
Diethyl Ether	2-Methyl propan-2-ol (Tert Butanol)	

For further information on flammable chemicals refer to section 4.

Storage of Dangerous When Wet Chemicals

“Dangerous when wet chemicals” **MUST** be stored in the flammables cupboard or in a separate segregated compartment lined with flameproof material such as Hardiflex.

Dangerous When Wet Chemicals [Class 4.3]

Barium Metal (in Paraffin Liquid)	Potassium Metal (in Paraffin Liquid)
Calcium Carbide	Sodium Pellets (in Paraffin Liquid)
Calcium Granules	Strontium
	Zinc Powder

Storage of Corrosives

Corrosives are materials which are acids or bases (caustics, alkalis) which may damage body tissue as a result of body contact, inhalation or ingestion. Corrosives may also:

- damage some plastics;
- release toxic or explosive products when reacted with other chemicals;
- liberate heat when mixed with water;
- damage metals releasing flammable hydrogen gas.

Chemicals designated as corrosive MUST be stored in a ventilated, lockable cabinet constructed from corrosive resistant materials. The cabinet:

- should (ideally) have two separate compartments to enable the segregation of acids and alkalis;
- shelf supports and door hinges MUST be checked regularly for corrosion;
- MUST be labeled with appropriate signage;
- contents MUST be organised so that solids are stored above liquids;

Corrosive chemicals MUST be stored away from flammables, oxidising agents.

Corrosives [Class 8]

Aluminum Chloride, hexahydrate	Phosphoric Acid (Meta)
Aluminum Sulphate anhydrous	Phosphorous Pentachloride
Ammonium Copper Chloride	Phosphorous Pentoxide
Ammonium Hydrogen Sulphate	Phosphorous Trichloride
Boric Acid	Phthalic anhydride
Bromine	Phthalic Acid (K Salt)
Calcium Oxide	Potassium Hydroxide
Calcium Hydroxide	Potassium Hydrogen Sulfate
Copper (I) & (II) Chloride	Potassium Oxide
Iron (II) Chloride, tetrahydrate	Soda Lime Granules
Iron (III) Chloride hexahydrate	Sodium Hydrogen Sulphate
Iron (III) Chloride anhydrous	Sodium Hydroxide (caustic soda)
Iodine	Sodium Phosphate Tribasic
Maleic Acid	Sodium Sulfide
Malonic Acid	Tri Sodium Orthophosphate
Mercury	Thymol
Mercury (II) Chloride	Tin (1V) Chloride, pentahydrate
Oxalic Acid	Zinc Chloride

Organic Alkalis

1,6Diaminohexane [Hexamethylenediamine]

Inorganic Alkalis

Ammonia Solution

Organic Acids

Acetic (Ethanoic) Acid
Acrylic (Propenoic) Acid
Bials Reagent
Butyric (Butanoic) Acid
Formic (Methanoic) Acid
Lactic Acid
Hexanoic Acid
Propanoic (Propionic) Acid
Sebacoyl Chloride (Decanodioyl Chloride)

Inorganic Acids

Bromine Water
Copper Electroplating Compound
Additive Electroplating Copper
Hydrobromic Acid
Hydrochloride Acid
Hydroiodic Acid
Nitric Acid
Phosphoric Acid
Sulfuric Acid
Sulfur Dioxide (Sulfurous Acid)
Silicon Tetrachloride

For further information on corrosives refer to section 4.

Storage of Oxidizers

Oxidizing chemicals can increase the speed and intensity of a fire by adding to the oxygen supply, causing materials that would normally not burn to ignite and burn rapidly. Oxidizers can also:

- react with other chemicals, resulting in release of toxic gases;
- decompose and liberate toxic gases when heated;
- burn or irritate skin, eyes, breathing passages and other tissues.

Chemicals designated as oxidising agents MUST be stored on shelves or within compartments lined with flameproof materials. Storage zones MUST be labelled appropriately. Store solids above liquids.

Oxidizing Agents [Class 5.1]

Calcium Nitrate tetrahydrate	Iodic Acid	Potassium Nitrate
Copper (II) Nitrate	Iron (III) Nitrate	Potassium Nitrite
Aluminum Nitrate nonahydrate	Lead Nitrate	Potassium Persulfate
Ammonium Nitrate	Lead Dioxide (Lead (IV) Oxide)	Silver Nitrate

Ammonium Persulfate	Lithium Nitrate	Sodium Hypochlorite
Barium Nitrate	Magnesium Nitrate	Sodium Dichromate dihydrate
Barium Peroxide, anhydrous	Mercury (II) Nitrate	Sodium Iodate
Bismuth Nitrate	Nickel (II) Nitrate	Sodium Periodate
Caesium Nitrate	Potassium Chlorate	Sodium Nitrate
Calcium Hypochlorite (bleaching powder)	Potassium Dichromate	Sodium Nitrite
Chromium (III) Nitrate nonahydrate	Potassium Iodate	Sodium Peroxide
Cobalt (II) Nitrate	Potassium Iodate (VII) (Periodate)	Strontium Nitrate
Hydrogen Peroxide (6% (35%))	Potassium Manganate (Potassium Permanganate)	Zinc Nitrate hexahydrate

For further information on oxidizers refer to section 4.

Storage of Spontaneously Combustibles

- Chemicals designated as spontaneously combustible **MUST** be stored on shelves or within compartments lined with flameproof materials.
- The storage zones **MUST** be labeled appropriately.
- Spontaneously combustible chemicals **MUST** be stored away from flammables and oxidizing agents.
- Particular care should be taken with the disposal of spontaneously combustible chemicals.

Spontaneously Combustible Chemicals [Class 4.2]

Carbon Powder	Sodium Ethyl Xanthate
Charcoal Granules	Sodium Sulfide
Sodium Dithionite anhydrous	Potassium Sulfide

Preparation of Explosive Mixtures

There are hazards involved in mixing chemicals that may appear to be relatively harmless but in combination may be quite dangerous. The preparation of explosives is illegal under the Explosives Act–1936 and a fine for breaches can be imposed.

In the event that a teacher was to conduct an experiment and there is potential for an explosion, the teacher **MUST** seek permission from the Principal. A documented risk assessment **MUST** be completed.

Heating of Materials

Prior to heating materials ensure that a risk assessment has been completed and that control measures are documented as part of a safe operating procedure. When heating solids or liquids:

- consult the relevant SDS if in doubt;
- wear appropriate personal protective equipment such as safety glasses, protective clothing, including gloves and closed shoes;

- use tongs or pegs to hold hot objects;
- place a fireproof mat under heating equipment and all hot objects;
- slant test tubes away from your body and that of others in close proximity (to avoid burns from the hot contents);
- set up equipment to avoid the possibility of people reaching over operating burners or hotplates;
- do not leave experiments unattended;
- use matches, flint lighters, or “gas match” type lighters to light burners;
- convert the blue Bunsen burner flames to luminous when not in use;
- always turn Bunsen burners off after use and allow sufficient time to cool down prior to storage;
- do not use flammable liquids (e.g. methylated spirits, acetone) near a source of flame. Any exception to this MUST be in accordance with a risk assessment.

10 Technical Studies Environment

Standards to be adhered to in relation to the physical environment, equipment, space, ergonomics and overall workshop safety can be found in the "[Workshop Technology & Machinery Safety Manual Version 2](#)". Use the following link to access information relating to this area of safety in the Technical Studies Environment.

Major Processes Found in This Environment

Technical Studies is a complex environment using a wide range of resources and processes. This then results in varied levels of risk in relation to exposure to hazardous chemicals dependent on the materials, projects, protocols plus numbers and skill levels of participants.

The predominant resources used in this environment are metal, wood and plastic. The development of products, using these and other resources, through such processes as gluing, coating, cutting, sanding, buffing, soldering etc result in the release of chemicals in the form of dust, fumes and gasses.

Not all areas of concern can be covered in this manual but some indication of the hazards involved will be detailed under process relating to metal, wood and plastic.

The principals outlined under Section 3 "Risk Assessment" and Section 4 "Chemical Management" **MUST** be applied to any product used in this environment.

Metal Work

Welding joins pieces of metal by the use of heat, pressure, or both.

Brazing, or soldering, involves a filler metal or alloy (a combination of metals) which has a lower melting point than the metal pieces to be joined. The filler materials (such as lead and cadmium) can be very toxic.

Metal cutting is done by heating the metal with a flame, and directing a stream of pure oxygen along the line to be cut.

Health Hazards of Welding

Gases and Fumes

Welding "smoke" is a mixture of very fine particles (fumes) and gases. Many of the chemicals in welding smoke, such as chromium, nickel, arsenic, asbestos, manganese, silica, beryllium, cadmium, nitrogen oxides, phosgene, acrolein, fluorine compounds, carbon monoxide, cobalt, copper, lead, ozone, selenium, and zinc can be extremely toxic.

Generally, welding fumes and gases come from:

- the base material being welded or the filler material that is used;
- coatings and paints on the metal being welded, or coatings covering the electrode;
- shielding gases supplied from cylinders;
- chemical reactions which result by the action of ultraviolet light from the arc, and heat;
- process and consumables used;
- contaminants in the air, for example vapors from cleaners and degreasers.

The health effects of welding exposures are difficult to list, because the fumes may contain so many different chemicals that are known to be harmful (depending on the factors listed above). The individual components of welding smoke can affect just about any part of the body, including the lungs, heart, kidneys, and central nervous system.

Soldering

Rosin or colophony fluxes used in metal soldering can cause health problems if fumes are inhaled or if flux gets on the skin. Short term problems can include nose, sinus, eye and throat irritation and skin rashes, and long term problems may include asthma and dermatitis.

Those most likely to be affected are people who do a lot of hand soldering, typically while repairing electrical or electronic equipment.

What are the symptoms?

Early symptoms of exposure include:

- watering, prickling eyes;
- running or blocked nose;
- sore throat;
- coughing, wheezing, tight chest and breathlessness; and
- itchy skin and dermatitis.

Chronic exposure may lead to asthma and may exacerbate existing asthma or respiratory problems in workers.

What are the hazards?

When heated during soldering, rosin fluxes give off fumes containing many chemical compounds. These can cause irritation and health problems if inhaled. Skin contact usually happens when people get flux on their hands while it is being applied to metal surfaces before soldering.

What are the risks?

Manual soldering with a hand-held soldering iron poses the highest risk of fume exposure because the operator's head is likely to be close to fumes coming from the work piece.

Use of paste or liquid fluxes increases the risk of skin contact. Rosin core solder, in which rosin is contained within a fine tube of solder, is the least likely to result in skin contact during hand soldering.

Flow and oven bake soldering, used in manufacturing, are less likely to expose workers to fumes because the work piece is usually isolated and the fumes extracted with mechanical ventilation systems.

Woodwork

Dusts

Exposure to wood dust has long been associated with a variety of adverse health effects. Health effects can include irritation (most common), allergic reactions and a rare nasal cancer. Wood dusts are a complex mixture of cellulose fibres, resins and contaminants such as fungal spores and other microbials, wood preservatives, coatings, sealants and glues (e.g. formaldehyde, pentachlorophenol, glycols, copper naphthanate, etc.) This mixture makes it difficult to determine a specific irritant or allergen. Particle size is another important factor. The smaller the dust particle the further it will travel into the lungs; symptoms of inflammation or allergy may develop after repeated exposure.

The irritation symptoms are generally caused by the physical, mechanical nature of wood dust particles. This may affect the eyes, upper and/or lower respiratory tract or the skin. Allergic symptoms are less common and always involve sensitization of the individual to a particular component(s) of the wood dust. This too may involve the skin, eyes, upper and lower respiratory tract including more serious symptoms of asthma such as wheezing and shortness of breath. Prolonged wood dust exposure in the woodworking industry is associated with a rare form of nasal cancer.

Fumes

Fumes are associated with the various applications of glues, stains, paints and varnishes. For the appropriate level of risk to be assessed with any of these products you are once again directed to the SDS information for each of these products.

Plastics

Fumes associated with heating or gluing may be toxic. Ensure you understand the nature of the product you are using before proceeding with projects.

There is substantial risk in melting/heating plastics [=polymers] without a fume hood and without knowing exactly what is in the plastics.

There are two classes of polymers: thermoplastic and thermosetting. The former will soften when heated; the latter will never soften, just decompose, when heated. Bakelite is an example of the latter.

Some polymers produce toxic gases when heated. For example, vinyl chloride produces HCl gas when heated. Plastics are not pure materials; they are formulated products. Some of the chemicals used to give the plastics their desired mechanical and physical properties also form toxic vapors when heated. An example is the common phthalate plasticizers. Some polymers "unzip" when heated evolving monomer vapors. Acrylates polymers are notorious for this. Acrylate monomers are toxic.

A safer route would be to use water dispensable gums [e.g. algenates] like dentists use to form a denture. These harden and can be used to form models from plaster of Paris, or self-reacting styrene formulations available at hobby stores. Even in this case adequate ventilation is necessary because styrene vapor is also toxic.

3D Printing

3D printers produce high amounts of ultrafine particles (UFPs) and volatile organic compounds (VOCs) while in use, and that these particles and vapors are detectable for many hours after the printers have been shut off. UFPs have been linked to adverse health conditions, such as asthma and cardiovascular issues, because they can pass through the lungs and travel to other organs. They can also transfer toxic material into the body, including blood and tissue cells.

UFPs and VOCs are produced by thermal decomposition when a 3D printer heats and melts a plastic filament. The most popular filaments used in 3D printing are acrylonitrile-butadiene-styrene (ABS) and polylactic-acid (PLA) filaments.

Sites need to ensure:

- 3d printers are operated in a well ventilated room with good air flow.
- Check if 3D printers have any form of internal/external carbon filter attached.
- If present, ensure carbon filters are maintained in accordance with the manufactures requirements.
- Considering installing localized exhaust tube/ducting from the cabinet of the printer to the outside atmosphere.
- Limiting the amount of 3D printing all at the same time.
- Printers are tested and tagged for electrical compliance.
- Are covered with a protective hood / cabinet fitted with an interlocking switch to prevent it being opened in operation.

Chemical Safety Equipment

The following safety equipment **MUST** be readily available where identified by a risk assessment as necessary.

Safety Items	Comments
Containers for storage and disposal of waste chemicals	Chemical wastes unsuitable for disposal in the sink or normal rubbish (e.g. organic solvents, heavy metal salts etc) <u>MUST</u> be collected in a suitably labeled container pending correct disposal.
Dust Extractor	A Dust Extractor <u>MUST</u> be available and used in Technical Studies teaching and preparation areas for activities that generate dusts and fumes. Dust Extractors <u>MUST</u> comply with the ventilation requirements set in Section 3 p23 "Ventilation" and provide air quality as set by Standard 3640 <i>Workplace Atmospheres - Methods of Sampling and Gravimetric Determination of Inhalable Dust</i> .
Fire blanket	Woolen or fiberglass, sited near exit door.
Fire extinguisher	<u>MUST</u> be placed near exit doors and outside of chemical storeroom.
First aid kit	Kits <u>MUST</u> comply with the Code of Practice: First Aid in the Workplace.
Hazard labels	These <u>MUST</u> be displayed where appropriate to indicate chemical, biological, electrical or radiation hazards.
Spill Kits	A risk assessment must be completed to determine appropriate contents for the spill kit. Chemical absorbent pillows or chemical absorbing agent <u>MUST</u> be available where liquid chemicals are stored or used.
Spray Booth	A Spray Booth <u>MUST</u> be available and used in Technical Studies teaching and preparation areas for activities that generate high levels of fumes, e.g. spray painting/varnishing. Spray Booths <u>MUST</u> comply with the requirements of Australian Standard 4114 (requirements include siting, provision of services, design, airflow and maintenance).
Telephone access	Emergency numbers should be permanently displayed nearby.
Trolley	These may be required for heavy items, or to transport equipment between areas. List trolleys on maintenance register for regular maintenance.

Personal Protective Equipment (PPE)

Personal Protective Equipment	Comments
Aprons and/ or Dust Coats	Dust coats should be worn when necessary. These items <u>MUST</u> be laundered as needed (once per term, depending on use).
Dust and fume protection	In normal circumstances adequate protection is provided by use of a dust extractor. However in some circumstances (e.g. cleaning up spills) use of a respirator may be required (refer to relevant SDS for type of cartridge, and refer to manufacturer's instructions regarding storage and shelf life). Dust masks should be made available for activities generating dust.
Eye protection	Safety glasses (or goggles) with side shields or face shields. To be worn in all areas when handling liquids and also hazardous situations. Safety glasses, goggles, face shields require regular cleaning. Cleaning can be by washing in detergent solution.
Gloves	PVC or Nitrile gloves suit handling of most chemicals. Leather gloves suit the handling of cryogenic or hot materials. Cotton gloves are required when using glue guns.

Cleaning/Housekeeping

- All benches MUST be cleaned regularly and thoroughly to reduce the possibility of chemical contamination.

- All sinks should be checked for obstructions and flushed regularly.
- Breakages, spills and excess waste MUST be cleaned up.
- Use warning signs as necessary.
- Scrap, waste and dusts etc MUST be placed in the appropriate bins.
- Spontaneously combustible chemicals and materials used with them should be immediately disposed of in accordance with the requirements of the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.
- Wet dusting is recommended to minimise air contamination.
- Floors should be wet-mopped and/or vacuumed/swept regularly.
- Chemical-based cleaning materials and equipment are to be used and stored in accordance with product instructions.
- High pressure air equipment related to the Spray Booth and general workshop to be serviced on a regular basis and checked before use.

Spillage

- Information to deal with chemical spillages can be accessed from the safety data sheets or from ChemWatch.
- Written procedures to deal with spillages MUST be available to all personnel working in Technical Studies areas and training provided for the implementation of these procedures. Records of all training MUST be kept.
- Adequate materials and equipment MUST be readily available for the control of spillage e.g. sand. Spilt materials MUST be handled and disposed of safely in accordance with the SDS.

When cleaning up spills:

- as advised by the SDS wear protective equipment such as gloves, safety glasses, face shield, dust coat;
- move leaking containers with care and if safe to do so transfer the contents to another container. Wash residue down the sink with plenty of running water if it is safe to do so;

Waste Disposal

- Environmentally safe practices, as described by the SDS, MUST be adopted for waste disposal.
- Liquid waste generated from class activities can in most cases be further diluted and flushed down the sink. [Sites where septic sewerage is connected should contact their local authority for guidelines].
- Excess acids and alkalis can be neutralized to within pH 6-10 then flushed down the sink.
- Flammable wastes (e.g. oils/solvents/paints/varnishes) MUST NOT be flushed down the sink. They MUST be stored for collection by an approved collection agency. Any waste chemical placed into containers for later disposal MUST be labeled correctly and appropriately stored.
- Hazardous chemicals MUST NOT be disposed of in the normal rubbish bins.
- Spontaneously combustible chemicals and materials used with spontaneously combustible chemicals should be immediately disposed of in accordance with the SDS. If immediate disposal is not possible, in the interim, store them in a sealed metal bin.

Ventilation and Air Quality

- Ventilation MUST be appropriate for the activities and the number of persons working in the area as identified by risk assessment. It MUST be sufficient to dispose of gases and fumes, and effectively circulate fresh air.
- Mechanical ventilation MUST conform to AS 1668—1998, “The use of ventilation & air-conditioning in buildings. Part 1: Fire & smoke control in multicompartiment buildings. Part 2: Mechanical ventilation in buildings. Part 4: Natural ventilation in buildings”. Ensure mechanical ventilation units e.g. air conditioners, exhaust fans/ducting, spray booths and dust extractors are listed on the site maintenance register.

Fume Extraction, Dust and Fume Control

- Dusts and fumes from a wide range of chemicals can cause respiratory complaints, skin allergies, or allergic sensitisation. Activities which generate fumes/vapours/mists or dusts, MUST be carried out in a spray booth or under appropriate exhaust systems.
- Spray booths MUST be available and used where appropriate.
- Spray booths MUST comply with AS 4114, particularly in aspects such as construction, positioning, performance and inspection.
- Installation MUST comply with legislative requirements to ensure that extracted fumes, dust do not pose a hazard for others at the worksite or within the general environment.
- Spray booths and dust extractors MUST be regularly serviced and records retained.

Air

Technical Studies areas often have a supply of high pressure air. Staff should be aware of hazards posed by high air pressure.

Gas Cylinders

All gas cylinders MUST be:

- stored in a well ventilated secure location away from excessive heat;
- securely supported using suitable racks, straps, chains or stands;
- transported and strapped to a cylinder cart;
- stored away from incompatible classes of gases.
- Gas cylinders must be less than 10 years old.
- Please refer to [CCSM Document 19: Management of Hazardous Chemicals](#) for further information.

Storage

- Store hazardous chemicals in an area that is accessible only to authorized staff.
- Shelves and racks MUST be stable and either built-in or securely fixed to walls.
- Storage MUST suit the items being stored (e.g. sufficiently strong, large enough so that items do not protrude outside the storage area, and where appropriate shelves should have raised lips to store round objects that may roll). Movable storage areas (including compactus units) MUST NOT be overloaded so as to create handling hazards.
- Items MUST be stored in a manner that makes them easily and safely accessible and should be stored at an appropriate height. Where items are stored above shoulder height,

the use of an approved safety ladder is required. Ladders MUST comply with AS1892 Portable Ladders.

- Stored items MUST NOT extend over doorways or into walkways under any circumstances.
- Safe manual handling principles MUST be followed when designing and utilising storage areas.
- Trolleys should be available for the movement of bulky or heavy items. Ramps to storage areas may be required.
- Chemicals should be stored in a well ventilated secure area, with restricted access.
- Store the minimum quantity required to maintain the curriculum.
- Particular categories of chemicals (e.g. oxidizers, dangerous when wet etc.) MUST be stored in the appropriate storage zone.
- Where possible, solids should be stored above liquids.
- General shelf chemicals can be organized in a format which suits the individual site function.
- Chemicals that fall into the Flammable, Corrosive, Oxidising Agent, Dangerous When Wet, and Spontaneously Combustible categories MUST be stored in the correct segregated storage zones.
- Incompatible chemicals MUST NEVER be stored together.
- Storage cupboards need to be suitable for their purpose and MUST be maintained in good condition with particular attention to ventilation.
- Regularly inspect seals and check for corrosion of shelf supports and door hinges.
- Storage cupboards MUST be labeled to identify the contents.

If storing 200L (44gallon drum) containers of oil, kerosene, diesel etc, they must be kept on a chemical bund.

Storage of Flammable Chemicals

Flammable and combustible liquids, solids or gases will ignite when exposed to heat, sparks or flames. Precautions to follow:

- minimise the quantity of flammable chemicals kept in the workshop;
- store and use flammable chemicals in well ventilated areas. Use a spray booth when working with chemicals that release flammable vapors;
- keep flammable chemicals away from ignition sources (eg spark from grinders);
- except for quantities needed at hand keep flammable chemicals in a flammables cabinet that is compliant with AS1940.

Where the total quantity of flammable chemicals stored in a workshop exceeds any of the table below for Class 3 chemicals (extract from AS 1940: Table 2.1):

- Packing Group I or 11 – 50 L per 50 m² of floor space
- Packing Group III – 100 L pr 50 m² of floor space
- Combustible Class 1 & 2 (total) 200 L

It is a legal requirement to keep them in a flammables cabinet, which MUST:

- be vented to the outside;
- be located away from heat sources;
- be labeled with appropriate signage;
- have solids stored above liquids;
- not have chemicals stored in the drip trays.