Science ASSIST Information Sheet

Risk Assessment

Introduction

This information sheet is an updated review of the answers to the following questions, and replaces the previously published Q&As:

- Can I use Dangerous goods classes to group risk assessments?
- How long are risk assessments current?
- What is the difference between the European Commission version of a risk assessment and the Globally Harmonised System version?
- Risk assessments for preparation and disposal: Is a risk assessment required every time I perform a task e.g., diluting concentrated HCl? Is an SOP sufficient?
- Risk assessments in NSW schools with regards to science experiments: do I need to provide my own risk assessment in situations where I am doing a science experiment that is written up in a text we are using, or is there an inherent risk assessment assumed to be completed by the textbook writers?
- Risk assessments: are risk assessments required for household items like bicarb and vinegar or boiling water in a beaker over a Bunsen burner? Does the food tech have to fill out risk assessments for doing these things and if not, then why do we have to for science? I have tried to tell them that they should always fill out a risk assessment and that it is to cover them and the school legally in case something should go wrong.
- Risk assessments: who does them? I have been told that as a lab tech, I have to write risk assessments for the teachers for classroom use. I know that they should definitely be writing their own, as they're the ones doing the experiment and I am not. Is there any documentation that says that it's THEIR obligation to write them and not someone else?

Expert answer 16th March 2023

In Brief

Schools have a general 'duty of care' to provide a safe environment for staff, students and visitors. All members of staff are required to comply with these legal obligations. Schools have policies in place that apply to all activities conducted in the education setting, which include, but are not limited to, excursions, sporting activities, student supervision and classroom activities. These policies should take into account areas of potential harm or injury. It is important for school science departments to follow the policies and guidelines of their individual school or controlling body for managing risks. The concept of 'duty of care' is contained in workplace health and safety legislation throughout Australia.[1]

The legislation governing hazardous chemicals and dangerous goods requires that all operations and experiments involving hazardous materials must have documentation showing an assessment of the risks involved and the implementation of controls to minimise exposure or chance of an emergency. These requirements can vary across jurisdictions (i.e., states and territories) and sectors (e.g., government, catholic or independent). It is important that hazards are identified and risk assessments conducted so that the relevant control measures can be put in place to reduce the level of risk. School science practical activities have the potential for a range of hazards from physical, mechanical, electrical, chemical, biological

and other specific hazards related to the workplace. Most science textbooks do not provide risk assessments for their experiments, whilst some give basic health & safety information.

For links to the health and safety legislation that covers your school, see the Science ASSIST information sheet : Support for school science.[2]

When do you need to do a risk assessment?

This is a complex question. In considering safety aspects of any substance, it is important to consider both what is being used and how it is being used. Conducting a risk assessment of a broad category such as a chemical group or class may limit the scope of the assessment; for a specific use of an individual chemical, a further risk assessment may be necessary. For example, a general risk assessment for handling/storing flammable solids might not include the precautions necessary for activities involving the burning of magnesium.

A risk assessment should be performed before the first time that you undertake a hazardous task or procedure to check that suitable controls are put into place to reduce the level of risk. It should take into consideration the site-specific details such as staff training, student behaviour (if applicable), the activity conducted and school facilities. It should be reviewed when there are any changes introduced, including new people undertaking the task, or when it has been five years since the last assessment.

Jurisdictional and Legislation and policies

Jurisdictional legislation and policies: It is essential to consult the policies and procedures of your school or school sector to determine what they require regarding risk assessments for chemicals. Note that in some jurisdictions (e.g., WA), a risk assessment is required for each hazardous substance used in the workplace.[3,4]

It is important to follow the policies of your particular school regarding the management of risk. For example, the following jurisdictions have information on their policies and procedures:

- The Victorian Department of Education: '*Chemical Management Procedure*'[5] see section 3.6.3 Risk Assessment for science experiments.
- The Queensland Department of Education: 'Health and safety risk management (education.qld.gov.au)[6]

In the Model Code of Practice[1] on “How to manage the risks associated with hazardous chemicals in the workplace”, Section 3, 'the risk management process' includes the topic 3.1: ‘Decide who should do the assessment'. This speaks of a collaborative approach, depending upon the expertise of the people involved. For complex cases, a number of people may need to be involved.

Chemical codes: GHS and AGD

The difference between the two types of risk assessment relates to which classification system is being used for the hazardous chemicals. Until recently, chemicals in all jurisdictions in Australia were classified according to the ADG (Australian Dangerous Goods) code[7] and the NOHSC (National Occupational Health and Safety Commission) approved criteria for classifying hazardous Substances [NOHSC:1008(2004)] 3rd Edition,[8] which is based on EC (European Commission) directives from 1967 and 1999 and their amended versions.

Currently, most—but not all—of the states and territories in Australia are in transition from using the ADG/NOHSC classification system to the GHS system, as part of the harmonisation of our Work Health and Safety Legislation.

A GHS-based risk assessment uses the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS),[9] which is an international system introduced to enhance chemical safe handling and transport and provides a basis for the harmonisation of chemical regulations at a worldwide level. Under the GHS, risk and safety phrases are replaced by hazard and precautionary statements.

The hazard classification of a chemical determines what information must be included on labels and Safety Data Sheets. Schools need to follow the work health and safety laws in their jurisdiction. Science ASSIST recommends that you follow the information relevant to the classification system that operates in your jurisdiction. When comparing these documents, we would expect that the safety information for the risk assessments should be similar.

It is important to have a good understanding of both the GHS and the ADG Code.

- The ADG Code relates to **physical hazards** such as flammability, corrosivity and oxidising properties, which are important considerations in the segregation of chemicals to ensure their **safe transport**.
- The GHS is a system of classification and labelling of workplace hazardous chemicals. The GHS classifies substances for the purpose of their **safe handling in the workplace** and includes health hazard classifications such as chronic toxicity or sensitising properties, which are not covered by the ADG Code as they not so relevant for the transport of chemicals. The GHS does not replace the ADG Code for the transport of chemicals.

Chemical categories: In general, the DG classes translate to GHS classifications. If conducting risk assessments according to chemical categories, either the DG classes or the GHS classifications could be used as a starting point, with further subgrouping where appropriate. The narrower the chemical category, the more specific the risk assessment can be. Some suggestions to consider:

- **An individual risk assessment** may be necessary for a chemical which has more than one hazard class.
- **Corrosive chemicals** might be further subdivided according to whether the substance is an acid or a base, and dilute or concentrated.
- **Flammable and oxidising chemicals** could be assessed according to their hazard class subdivisions.
- **Inorganic solids** could be grouped according to the cation, where the cation is hazardous (e.g., nickel salts, copper salts) or according to the anion where this is hazardous (dichromates, sulfides).
- **Organic substances** could be treated according to functional group (e.g., alcohols, alkanes, esters).
- **Toxic chemicals** are a more complex hazard class. The following categories or groups could be considered for risk assessment purposes:
    - **Acute toxicity:** In general, Dangerous Goods Class 6.1 Toxic substances corresponds to the GHS hazard class acute toxicity, categories 1,2 or 3. These substances are identified with the GHS06 pictogram (skull and crossbones). Substances with Specific Target Organ Toxicity - single exposure, identified by the GHS08 pictogram (health hazard), could be included here.
    - **Chronic toxicity:** Substances of chronic, rather than acute, toxicity, such as carcinogenicity, mutagenicity and reproductive toxicity, identified with the GHS08 pictogram (health hazard). Substances with Specific Target Organ Toxicity - repeated exposure, identified by the GHS08 pictogram (health hazard), could be included here.
    - **Dyes/stains/indicators:** many of these have an associated chronic toxicity hazard.
    - **Enzymes:** many of these are respiratory sensitisers or have a chronic toxicity hazard.

GHS

Under the model work health and safety laws, Australia has adopted the 7th revised edition of the GHS. In the GHS there are 9 hazard pictograms and some of these may identify more than one hazard category. For more information see:

https://www.safeworkaustralia.gov.au/doc/model-code-practice-managing-risks-hazardous-chemicals-workplace[10]

The Australian Dangerous Goods (ADG) Code:

The ADG classification provides a good basis for the organisation of chemical storage according to the **physical hazards** presented by the various dangerous good classes. The DG classification can be found in Section 14 of the safety data sheet. Note that there can still be incompatibilities within a Dangerous Goods class and where a chemical belongs to more than one class.

Who does risk assessments?

Generally, the risk assessment for a practical activity in the laboratory/classroom environment would be conducted by the classroom teacher. They will need to assess the activity in view of their students' skills, abilities, behaviour, any medical conditions and the room facilities. The risk assessment for processes in the preparation room, generally would be conducted by the science technician. However, there may be times when a technician may have more knowledge of a chemical/process/technical skill than the teacher or vice versa. At these times a collaborative approach is most appropriate.

Guidance material for conducting risk assessments can be found in **Section 3** of the Model code of practice: *Managing risks of hazardous chemicals in the workplace.*

How often do risk assessments need to be updated?

Generally speaking, a risk assessment for an activity should be retained as long as it is relevant to the task performed. Risk assessments should be reviewed whenever: a new hazard or risk is identified, existing control measures are not working effectively, there are changes to staff, equipment or chemicals and if the Safety Data Sheet has been updated. In a school situation, this means that a review should take into consideration:

- staff training,
- student behaviour,
- the activity conducted and the nature of the hazard,
- equipment and chemicals used,
- school facilities (e.g., a change to a different type of room).

Although there are no set times that workplaces need to keep these records for, it is good practice to keep a copy of your risk assessment, preferably attached or electronically linked to the activity involved. It serves as a record of your assessment, compliance with your Occupational or Workplace Health and Safety obligations, a reminder for the next time you perform this task, as well as a guide for future risk assessments. The aim is to ensure that suitable controls are put into place to reduce the level of risk.

It is essential that the emphasis is on the thinking process involved in identifying the hazards, assessing the risks and then applying control measures to minimise the risks. The Science ASSIST Risk Assessment Template is designed to help you in this process.

Can Risk assessments be reused?

If an existing risk assessment is to be used again for the same activity, it needs to be reviewed to consider if the circumstances are similar and take the following aspects into consideration:

- staff training (e.g., does the staff member have the skills, training and experience to safely manage the activity?);
- student behaviour (e.g., do the students follow instructions and laboratory safety rules?);
- the activity conducted and the nature of the hazard (e.g., have any new hazards been identified, or have any existing control measures not worked effectively?);
- equipment and chemicals used (e.g., are all of the equipment and chemicals still in good condition, all portable electrical equipment within date for its electrical testing?);
- school facilities (e.g., is the room similar to the previous room with the same facilities such as running water, reticulated gas for Bunsen burners, appropriate firefighting equipment etc.)

Note that this review should also be conducted when using example risk assessments prepared by organisations such as an educational jurisdiction or text book supplier to ensure that the conditions are similar.

Storage of risk assessments

Whilst there is no legal requirement in Australia to maintain records of risk assessments for school science activities that have been conducted, it is a good idea to archive past risk assessments. If an incident requires further investigation, past documentation could be important. Note: in WA there is a mandatory requirement to have records of risk assessments for each hazardous substance used in the workplace and also to record that this has been done in the hazardous substance register.[11]

Under all the occupational and workplace health and safety legislation, there is an obligation to assess the risks associated with hazards and implement control strategies to reduce the level of risk. A record of this process is evidence that this has been done. Each school sector or jurisdiction usually has its own policies and procedures concerning the keeping of health and safety documentation and these may well include keeping records of the risk assessments for science activities. Risk assessments may be required documents in health and safety incident/accident investigations. An essential part of the risk management process is also to monitor and review the effectiveness of control measures. This is most easily done if records are kept.

Keeping records of the risk management process has the following benefits. It:

- allows you to demonstrate how decisions about controlling risks were made,
- assists in targeting training at key hazards,
- provides a basis for preparing safe work procedures,
- allows you to more easily review risks following any changes to legislation or business activities,
- demonstrates to others (regulators, investors, shareholders, customers) that work health and safety risks are being managed.

The detail and extent of recording will depend on the size of your workplace and the potential for major work health and safety issues. It is useful to keep information on:

- the identified hazards,
- assessed risks and chosen control measures (including any hazard checklists, worksheets and assessment tools used in working through the risk management process)
- how and when the control measures were implemented, monitored and reviewed

- who you consulted with
- relevant training records
- any plans for changes.

You should ensure that everyone in your workplace is aware of record-keeping requirements, including which records are accessible and where they are kept.

Additional Information

Science ASSIST has produced an information sheet regarding labelling systems: see AIS: Chemical Labels

Science ASSIST has other resources that may be helpful.

- AIS: Risk Management and risk assessment which gives a brief overview of risk management and conducting a risk assessment and is a guide to completing the Science ASSIST Risk Assessment Template.
- SOP: Diluting concentrated hydrochloric acid and its associated Example risk assessment for diluting concentrated hydrochloric acid.

Recommendations

- Science ASSIST recommends that a site-specific risk assessment be carried out for all science practicals to evaluate the activity being carried out so as to identify, assess and control any hazardous activities and/or processes. When assessing risks associated with a task, you need to consider any physical activities, the nature of the hazard itself, any equipment being used and who is involved. The person that has the best knowledge of the particular risks should carry out the risk assessment, generally, within a classroom, this is the classroom teacher, while in the preparation room, this would be the science technician. However, there may be times when a collaborative approach is more appropriate

- Science ASSIST considers that it is good practice to keep a copy of previous risk assessments, preferably attached or electronically linked to the activity involved. It serves as a record of your assessment, compliance with your Occupational or Workplace Health and Safety obligations, a reminder for the next time you perform this task as well as a guide for monitoring and reviewing control measures in preparing future risk assessments. The main aim is not to focus on the paperwork of the risk assessment process, but to ensure that suitable controls are put into place to reduce the level of risk.

- It is important that all schools be aware of and follow the safety systems established in their school sector or jurisdiction. For further information regarding risk assessment and links to jurisdictional risk management information, see AIS: Risk Management and risk assessment.

- It is important for all areas within the school to follow the policies and guidelines of their individual school or controlling body for managing risks. With regard specifically to assisting the science department, Science ASSIST has developed a Risk Assessment Template see Risk Assessment Template.

- Science ASSIST recommends that a risk assessment be conducted even when you have an SOP. Although there are no set times that workplaces need to keep these records, it would be good practice to attach your site-specific risk assessment to your SOP that serves as both a record of

your assessment, a reminder for the next time you perform this task, as well as a guide for future risk assessments. This does not need to be a lengthy process.

Standards

Standards Australia. AS/NZS 2243.10-2004 Safety in Laboratories – Storage of chemicals. Sydney, Australia.

Standards Australia. 2021. AS/NZS 2243.1:2021 Safety in laboratories Part 1: Planning and Operational Aspects. Sydney, Australia

References

[1] Safe Work Australia website, (2022, April 14), '*Model work health and safety regulations',* retrieved from https://www.safeworkaustralia.gov.au/doc/model-whs-regulations

[2] Science ASSIST website, (2022, August 31), '*Information Sheet: Support for school science',* retrieved from https://assist.asta.edu.au/resource/4798/science-assist-information-sheet-support-school-science

[3] Curtin University website, (2022, April 1), '*Risk assessments',* retrieved from https://healthandsafety.curtin.edu.au/hazardous-materials/risk.html

[4] Western Australian government, Department of justice website, (2022), 'Western Australian legislation - *Work health and safety (general) regulations 2022',* retrieved from https://www.legislation.wa.gov.au/legislation/statutes.nsf/law_s53267.html

[5] Victorian government, Department of education website, (2022, March 7), '*Chemical management',* retrieved from https://www.education.vic.gov.au/hrweb/safetyhw/Pages/chemicalmgt.aspx

[6] Queensland government department of education website, (2021, March 9), '*Health and safety risk management',* retrieved from https://education.qld.gov.au/initiatives-and-strategies/health-and-wellbeing/workplaces/safety/managing/risk-management

[7] National transport commission website, (2023, April 1), *'The Australian Dangerous Goods Code'* retrieved from https://www.ntc.gov.au/codes-and-guidelines/australian-dangerous-goods-code

[8] Western Australian government, department of mines, industry regulation and safety website, (2021, August 4), '*Guidance about hazardous chemicals',* (provides link to NOHSC1008-2004) retrieved from https://www.dmp.wa.gov.au/Safety/Guidance-about-hazardous-6930.aspx

[9] Safe Work Australia website, (accessed 2023, March), '*Using the GHS',* retrieved from https://www.safeworkaustralia.gov.au/safety-topic/hazards/chemicals/classifying-chemicals/using-ghs

[10] Safe Work Australia website, (2021, February 24), '*Model code of practice: Managing risks of hazardous chemicals in the workplace',* retrieved from https://www.safeworkaustralia.gov.au/doc/model-code-practice-managing-risks-hazardous-chemicals-workplace

[11] Western Australian government, department of mines, industry regulation and safety website, (2021, August 4), '*Hazardous substances FAQs',* retrieved from https://www.commerce.wa.gov.au/worksafe/hazardous-substances-faqs

[12] Queensland Department of Education and Training website, (2022, March 29), *'Chemical handling procedure',* retrieved from https://ppr.qed.qld.gov.au/pp/chemical-management-procedure

CLEAPSS UK website, (2017, July), '*Making and recording risk assessments in school science',* https://science.cleapss.org.uk/resource-info/ps090-making-and-recording-risk-assessments-in-school-science.aspx (Member log in required)

Further reading

Workcover Tasmania website, (2022, June 9th), '*Record keeping',* retrieved from https://worksafe.tas.gov.au/topics/Health-and-Safety/managing-safety/getting-your-safety-systems-right/record-keeping

Safeworkpro website, (2019, September 1), '*Why should you keep records of risk assessment reports',* retrieved from https://www.safeworkpro.com.au/why-should-you-keep-records-of-risk-assessment-reports/