THE UNIVERSITY OF SYDNEY

RISK ASSESSMENT FORM

Use this form to assist you to complete risk assessments for hazardous activities and processes. Any serious or ongoing hazards should be reported via RiskWare to ensure that appropriate corrective actions are tracked and completed.

Faculty/School:	Science/Partner Engagement and Outreach/Chemistry	**Initial Issue Date: 17/05/2023** **Next Review Date: 17/05/2024**
Risk Assessment Reference Number:	01/2023	
Risk Assessment Name:	Kickstart Chemistry 2023 – Inorganic Substance Analysis Workshop	
Prepared by:	Gabriel Ha Nguyen, Senior Science Communicator (Chemistry, Physics and Geosciences)	
Responsible supervisor/s:	Kristin Anderson, Head, Partner Engagement and Outreach, Faculty of Science	

Identify the activity and the location	**Identify who may be at risk** This may include fellow workers, students, visitors, contractors and the public
Activity or process: Workshop on titration, gravimetric analysis and spectrophotometry for HSC students and their teachers	**Persons at risk**: HSC students and teachers visiting the university, staff including Senior Science Communicator and lab demonstrators.
Location: Second & Third Year Laboratory, Level 4, School of Chemistry	**Risk assessment team (Who was consulted?):** Gabriel Ha Nguyen, Eugenia O'Brien, Yuen Cheng

List of Legislation, Code of Practice, Australian Standards, Guidance Materials used to determine control measures
Work Health and Safety Act 2011 Chemistry Safety Handbook School of Chemistry Risk Assessments RA-CHEM-030 Use of Cary UV-Vis Spectrometer 045A_RA-SWP_CHEM Elevated_Ambient_Conditions CHEM_SWP-RA_019A_Filtration_20180622

Risk Assessment Methodology
Assessing the risk is a brainstorming exercise, which is most effectively carried out in a team environment with the people required to complete the activity or process. Most activities or processes are broken down into a variety of separate tasks. For each task, consider the hazards, the potential harm or negative outcomes and the conditions required for those negative outcomes to occur. Whenever assessing the health and safety risks associated with a task, always consider the following primary risk factors. • The **physical activities** required to complete the task e.g. repetitive movement, high force, physical exertion, awkward posture • The **work environment** e.g. lighting, work layout, traffic, thermal comfort, working in isolation • The **nature of the hazard itself** e.g. working with chemicals, microorganisms, radiation, machinery, potentially violent clients • The **individual workers involved**, e.g. level of training, skills, experience, health, age, physical capacity The information gathered from the **risk assessment** process must be used to develop a **Safe Work Procedure (SWP).**

Task or scenario	**Hazard/s**	**Associated harm,** e.g. what could go wrong?	**Existing Risk Controls**	**Current risk rating** Use the Risk Matrix	**Any additional controls are required?**[1]	**Residual risk rating** Use the Risk Matrix
Use of chemical solutions (all less than 50 mL): 0.01 M EDTA, 0.05 M sodium chloride, 0.1 M magnesium sulfate, 5% barium chloride, 0.01 M potassium thiocyanate, $2x10^{-3}$ M iron (III) chloride in 1M HNO_3. Use of chemical solids: 1 g ammonium sulfate.	Skin or eye exposure to chemicals	Reaction or chemical burn	Chemical concentrations will be as low as practical. Safety glasses and lab coats will be worn for the entirety of the workshop. Gloves will be available if required. Safety Data Sheets will be made available and all staff will receive training in appropriate handling and disposal of solutions. Students will work in small groups and will be given clear instructions on the use of chemicals and be supervised while using them Chemicals will be stored in appropriate and clearly labelled containers. The closest eye wash facilities will be located where students can wash hands/eyes if they get chemicals on them.	Medium		Medium
Use of toxic or corrosive reagents for titration – 0.25 M K_2CrO_4 (3-4 drops), 5% w/v $BaCl_2$ (50 mL) and 0.05 M $AgNO_3$ (50 mL in burette), pH10 ammonia buffer (10 mL)	Exposure to toxic reagents	Skin irritation, reaction or chemical burn	Potassium chromate dropper bottle to be handled by demonstrators only, with minimum volumes used. pH10 buffer to be transferred from Schott bottle to student conical flasks by demonstrators only. Barium chloride concentration to be kept low and spills to be promptly cleaned up to minimise exposure. Silver nitrate concentration to be kept low (0.05 M) and demonstrators to fill up burettes for students, using a funnel to avoid spillage. Demonstrators and students will wear gloves when handling the solutions.	Medium		Medium

[1] Always consider whether or not it is possible to eliminated the hazard or hazardous task altogether. If this is not possible, refer to the hierarchy of risk controls.

Using electrical equipment eg. Spectrophotometer, Vacuum pump, Stirrer Hot Plate	Faulty Equipment Short circuit of instrument due to spillage of liquid	Electric Shock Damage to equipment	All equipment is tested and tagged annually to check for good working order. Staff check equipment when setting up. All equipment is fit for purpose. Equipment has in-built safety controls eg. UV-Vis Spectrophotometer does not emit light unless the lid is closed. Stirrer bars to be kept to a minimum rotation speed necessary for the mixture of chemicals to reduce chance of spillage.	Medium	Emergency controls	Medium
Use of stirrer hotplates	Hot plate and liquid	Burn from contact with hot plate or hot liquid	Hot plates will only be turned on when required for heating. Students will be briefed on safe work procedure for hotplates and liquids, including stirring to reduce risk of hot liquid splashes.	Low		Low
Vacuum filtration using Buchner flasks to recover barium sulfate precipitate	Implosion of glassware Flask and funnel can fall over and spill hot contents or break	Implosion and breakage of glassware could cause cuts or other injury Burn from hot liquid	Check equipment for star cracks and other faults prior to use. Clamp flask firmly to avoid the need to hold a vessel under negative pressure. Wear heat protective gloves where necessary. Wear appropriate personal protective equipment at all times. Eye protection and lab coat are to be worn at all times.	Low		Low
Using glassware	Glass breakages	Cuts from glass	Students will be instructed to handle all glassware with care. Any glass breakages will be cleared by staff using a dustpan and brush and using sharps containers for disposal. Students will be advised to clear any areas in which glass has been broken. First aid/band aids can be administered should anyone receive a cut from a glass breakage.	Low		Low
Wearing gloves	Allergy to disposable gloves	Skin reaction to nitrile PPE	Students will be asked if they have an allergy to gloves prior to workshop. A range of PPE options will be made available if required. Students or demonstrators wearing gloves will remove and replace with new gloves if wearing for more than 15 minutes continuously, or if gloves become torn or punctured.	Low		Low
High School students on campus	Student unaccounted for	Students could get lost on campus	Students will be in the care of their teachers while not participating in the competition	Low		*Low*

			Security will be notified in the event of a lost participant.			
Students attend in school uniforms	Student legs are unprotected from spills	Reaction or chemical burn	Students will wear lab coats and will be instructed to wear them fully buttoned at all times. Long pant exemption for the School of Chemistry has been written and provided to the School of Chemistry Safety Committee in 2019. Supervisor to review submission and update as necessary. Communications to schools will inform them that the wearing of long pants is encouraged.	Low		*Low*
Spillages	Slips and falls because of spills	Injury from slipping	The area around a spill will be isolated and cleaned up immediately.	Low		Low
COVID-19	Large gathering of people	Spread of infectious disease	Students will be spaced throughout the lab to allow for 1.5 m between groups Schools will be clustered in groups to reduce mixing between schools Participants will be reminded of hygiene practices prior to arriving and at the beginning of the event	Medium	Event will be reviewed if there is a change in the public health conditions, or increased restrictions from NSW Health	*Low (as at 17/05/2023)*
Emergency Evacuation	Depends on the nature of the evacuation	Depends on the nature of the evacuation	Kickstart demonstrators will isolate instruments and experiments where necessary and follow the instructions of University technical staff for evacuation procedures.	Low	University Emergency Controls Participants will also be reminded to disperse, not gather outside to allow the group to maintain physical distancing once evacuated	Low

Implementation of Additional Risk Controls				
Additional controls needed	**Resources required**	**Responsible person**	**Date of implementation**	**RiskWare Reference**
Write the Safe Work Procedure (SWP)	Time (approx 1 hour)	Gabriel Ha Nguyen	29/05/2023	N/A
Train workers to complete process in accordance with SWP	Time – supervisor and workers	Gabriel Ha Nguyen	29/05/2023	N/A
Make materials safety data sheets available	Time (approx. 1 hour)	Gabriel Ha Nguyen	29/05/2023	N/A
Arrange safe work area	Time (approx. 5 hours)	Gabriel Ha Nguyen	29/05/2023	N/A

List emergency controls for how to deal with fires, spills or exposure to hazardous substances and/or emergency shutdown procedures

In case of fire:

1. Contain or manage the situation, if safe to do so
2. Raise the alarm by activating a 'Break Glass' alarm
3. Evacuate via your closest safe exit
4. Call Triple Zero (**000**) and Security (935**1-3333**)

In case of chemical spills:

1. Control the source of release or contain the spill, if safe to do so
2. Evacuate and secure the immediate area
3. Determine if local and/or emergency services assistance is required

If the incident can be managed locally;

1. Ensure that two trained staff are allocated to clean-up
2. Use appropriate personal protective equipment
3. Absorb any free liquids, collect any solids and/or ventilate the area
4. Collect, label and dispose of spill residue as hazardous waste
5. Decontaminate the affected area and equipment

In case of exposure to hazardous substances:

1. Stop work quickly and respond to spills or an uncontrolled release.
2. Refer to the Safety Data Sheet (SDS) for specific hazard information.

If a person is seriously ill or injured:

1. Don't hesitate to call Triple Zero (**000**) and ask for an ambulance.
2. Contact the closest first aid officer.
3. If the person is unconscious, send for the closest Automatic Electronic Defibrillator (AED).
4. Call Security (935**1-3333**).
5. Send people to flag and direct the ambulance on arrival.

Unattended bags or other suspicious items:

If you see an unattended bag or other item that looks unusual or suspicious

1. Do not disturb the item
2. Move away
3. Call Security (935**1-3333**)

Security will assess the situation.

Report an incident, hazard, or injury using RiskWare, within 24 hours.

REVIEW			
Scheduled review date	**1 year**	**2 years**	**3 years**
Are control measures in place (YES/NO)			
Are controls eliminating or minimizing the risk (YES/NO)			
Are there any new problems with the risk (YES/NO)			
Reviewed by:			
Actual Review date:			

Risk Matrix.

			Potential Consequences				
			Class 3	Class 2	Class 2	Class 1b/1c	Class 1a
			Minor injuries or physical discomfort. Short-term psychological impact (isolated or one-off event).	Injury or illness requiring medical treatment and/or short-term impairment (less than 2 weeks). Psychological impact requiring support.	Injury or illness requiring hospital admission and/or temporary impairment (less than 6 months). Psychological impact requiring medical treatment.	Injury or illness (physical or psychological) resulting in long-term or permanent impairment (more than 6 months). Injury or illness resulting in temporary impairment to multiple people.	One or more fatalities. Injury or illness resulting in long-term or permanent impairment to multiple people.
			Insignificant	**Minor**	**Moderate**	**Major**	**Severe**
Likelihood	Expected to occur regularly under normal circumstances	**Almost Certain**	**Medium**	**High**	**Very High**	**Very High**	**Very High**
	Expected to occur at some time	**Likely**	**Low**	**Medium**	**High**	**Very High**	**Very High**
	May occur at some time	**Possible**	**Low**	**Medium**	**Medium**	**High**	**High**
	Not likely to occur in normal circumstances	**Unlikely**	**Low**	**Low**	**Medium**	**Medium**	**High**
	Could happen, but probably never will	**Rare**	**Low**	**Low**	**Low**	**Medium**	**Medium**