Laboratory Risk Assessment Tool

The Laboratory Risk Assessment Tool provides a framework for researchers to perform risk assessments on experiments. By identifying the hazards, controls needed, and analyzing each step of the process prior to performing the experiment, this tool will help reduce risk of injuries and incidents.

Lab Group:	
Completed By:	**Date:**
Brief Description of Operation/Experiment:	

Identify General Hazards: Perform background research to identify the hazards of the reagents, reactions, and/or processes. Review lab protocols, Standard Operating Procedures (SOPs), Safety Data Sheets (SDS), and safety information for materials, equipment, and processes. Check all hazards that apply below.

Hazardous Agents	
Physical Hazards of Chemicals	**Health Hazards of Chemicals**
☐ Compressed gases	☐ Acute toxicity
☐ Cryogens	☐ Carcinogen
☐ Flammables	☐ Eye damage/irritation
☐ Organic peroxides	☐ Nanomaterial
☐ Oxidizers	☐ Reproductive toxin
☐ Peroxide forming chemicals	☐ Sensitizer
☐ Potentially explosive	☐ Simple asphyxiant
☐ Pyrophorics	☐ Skin corrosion/irritation
☐ Water reactive	☐ Specific target organ toxicity
☐ Hazard not otherwise categorized:	☐ Hazard not otherwise categorized:
☐ Hazard not otherwise categorized:	☐ Hazard not otherwise categorized:

Hazardous Conditions or Process	
Reaction Hazards	**Hazardous Processes**
☐ Explosive	☐ Generation of air contaminants (gases, aerosols, or particulates)
☐ Exothermic, with potential for fire, excessive heat, or runaway reaction	☐ Heating chemicals
☐ Endothermic, with potential for freezing solvents or decreased solubility	☐ Large mass or volume
☐ Gases produced	☐ Pressure > atmospheric
☐ Hazardous intermediates/products	☐ Pressure < atmospheric
☐ Hazardous side-reactions	☐ Scale-up of reaction
☐ Other:	☐ High voltage
☐ Other:	☐ Hand/power tools/machinery
☐ Other:	☐ Needles/sharps
☐ Other:	☐ Hazard not otherwise categorized:
☐ Other:	☐ Hazard not otherwise categorized:

Outline the Procedure: List the steps or tasks for your procedure in the table below, including set-up and clean-up steps. For each step of the procedure, identify the hazard/potential consequences. Define the hazard control measures or precautions to minimize the risk of each step (e.g. run at microscale, work in fume hood, wear a face shield, etc.)

Step or Task	Hazard(s)	Hazard Control Measure(s)

Safety Control Summary: Indicate the controls utilized in the outlined procedure.

Engineering Controls	PPE
☐ Fume hood	☐ Appropriate clothing (long pants, closed toe shoes)
☐ Biosafety cabinet	☐ Gloves - indicate type:
☐ Glove box	☐ Safety glasses
☐ Blast shield	☐ Safety goggles
☐ Pressure relief device	☐ Face shield and goggles
☐ Thermocouples	☐ Lab coat
☐ Other:	☐ Flame-resistant lab coat
☐ Other:	☐ Other:

Specific Considerations: Indicate any unique considerations for the process in regards to the below.

☐ Lab specific training:
☐ Lab SOP(s) to review:
☐ Decontamination Procedures:
☐ Hazardous waste:
☐ Special Emergency Procedures (if spill, fire, or personal exposure occurs):
☐ Other:
☐ Other:

Challenge Your Methods: Designing safe experiments requires that we consider that the process may not proceed as expected. Challenge your assessment and process by asking "What if…?" questions. These "What if" questions should probe potential gaps in your knowledge or logic. Factors to consider are human error, equipment failures, and deviations from planned/expected parameters (e.g. temperature, pressure, time, flow rate, scale/concentration).

What If Analysis
What if...? Examples: there is a loss of cooling?...valves/stopcocks are left open? ...there is an unexpected over-pressurization? ...a spill occurs?
Then…there may be a runaway reaction ...there may be an unexpected splash potential ... the reaction vessel may fail …there may be a dermal exposure.
What if…?
Then…
What if…?
Then…
What if…?
Then…

Assess Your Design. Look over the identified hazards, the outlined procedure, and the challenges to your methods to determine if you should proceed with the experiment. Are any changes needed to the experimental design due to unacceptable risk? Are there additional controls needed? Can you do a dry run of the procedure without hazardous materials or with less hazardous materials? Can you test your design at a smaller scale?

Trial Run
Trial Run Procedure:
Experimental Design Changes (if needed):

Perform and Evaluate. Run your procedure and evaluate the controls and hazards as you work. If changes are needed to your process/controls, update the portions of this risk assessment and re-evaluate.

Evaluate Your Process
What went well?
Did the controls perform as expected?
Did anything unexpected occur?
Did a hazard manifest itself that was not previously identified?
Any close-calls or near misses?
Did something go exceptionally well that others could learn from?
I plan to evolve my procedure by…..

Additional Notes