



## 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.

<b>Lab Group:</b>	
<b>Completed By:</b>	<b>Date:</b>
<b>Brief Description of Operation/Experiment:</b>	

**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.

<b>Hazardous Agents</b>	
<b>Physical Hazards of Chemicals</b>	<b>Health Hazards of Chemicals</b>
<input type="checkbox"/> Compressed gases	<input type="checkbox"/> Acute toxicity
<input type="checkbox"/> Cryogenics	<input type="checkbox"/> Carcinogen
<input type="checkbox"/> Flammables	<input type="checkbox"/> Eye damage/irritation
<input type="checkbox"/> Organic peroxides	<input type="checkbox"/> Nanomaterial
<input type="checkbox"/> Oxidizers	<input type="checkbox"/> Reproductive toxin
<input type="checkbox"/> Peroxide forming chemicals	<input type="checkbox"/> Sensitizer
<input type="checkbox"/> Potentially explosive	<input type="checkbox"/> Simple asphyxiant
<input type="checkbox"/> Pyrophorics	<input type="checkbox"/> Skin corrosion/irritation
<input type="checkbox"/> Water reactive	<input type="checkbox"/> Specific target organ toxicity
<input type="checkbox"/> Hazard not otherwise categorized:	<input type="checkbox"/> Hazard not otherwise categorized:
<input type="checkbox"/> Hazard not otherwise categorized:	<input type="checkbox"/> Hazard not otherwise categorized:

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



**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).

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

**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?

<b>Trial Run</b>
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.

<b>Evaluate Your Process</b>
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.....

<b>Additional Notes</b>