**Lesson Plan: Lecture 22**

**Chemical Exposure and Dosage**

**Description**

In this lecture, students learn components of risk - hazard and exposure and how green chemistry aims to minimize hazard, which ultimately leads to minimizing the risk. This lecture also defines the concept of dose and how the toxicity testing is currently done through dose-response curves. A small class activity on the dose-response curve for solvents allows student to use their newly learned knowledge on dose-response in practice and a quiz at the end summarizes the key concepts covered during this class period.

**Prior to Lecture**

Required Readings:

* Toxicology - Dose Response (see folder)

Videos:

* [Toxicology - Dose Response](https://youtu.be/BukK1R3lCnU)

**Topics to Cover in Lecture**

* Risk assessment
* Hazard
* Exposure
* Dose
* Dose response curve
* LOAEL, NOAEL, reference dose
* Tools for hazard characterization

**Class Exercise**

In-Class Discussion- Which Solvent Would You Use?

This class exercise can be easily included in the lecture. It asks students to compare two solvent dose-response curves and assess which of the solvents is safer to use based on the graph. Answers & arguments may vary, but the bottom line is to encourage the conversation.

Lettuce Seed Assay (optional)

An optional laboratory exercise to visually introduce ecotoxicity.

Students assess the toxicity of methanol, ethanol and isopropanol by examining the effect these substances have on germination of lettuce seeds. The procedure introduces students to the concepts of toxicity measurements, while using standard equipment and common techniques such as serial dilution and volumetric measurement.

For more details, please refer to Lettuce Seed Assay Exercise.

# Daphnia Bioassay LD50 (optional)

Students study the effect of de-icers on organisms. Specifically, in this experiment students will be performing a bioassay to determine the LD50 of road de-icers on a culture of Daphnia. The LD**50** is the lethal dose of a compound that will kill 50% of a group of animals when 100% of the organisms are exposed. The experiment will assess the toxicity of road salt and road salt substitutes.

For more details, please refer to Daphnia Bioassay-LD 50 Exercise

**Homework**

Chemical Exposure and Dose, Homework #5