GOAL:
- Learn how to gauge reaction progress from TLC, review extraction, and dictate product ratios using H NMR.

KEY CONCEPTS (LAB TECHNIQUES):
- TLC:
  - The more polar a compound is, the more it will interact with the polar stationary phase than a nonpolar compound will. Thus, the compound will also have a lower Rf value.
  - Solvent only changes how far spots move up a TLC plate. Even if you changed the eluting solvent (mobile phase), you would not be able to change the order in which the compounds elute up the column.
  - More polar solvents have higher Rf values than less polar solvents
  - The only way to reverse the order of spots on a TLC plate is to change the material (i.e. the polarity) that the TLC plate is made of.

KEY CONCEPTS Oxidation/Reduction:
- Investigate the stereochemical outcome of redox reactions. In particular, the effect on the diastereomer ratio of a 4-tert- butylcyclohexanol mixture which is oxidized into 4-tert-butylcyclohexanone using sodium hypochlorite and glacial acetic acid in an acetone solvent which will later be reduced back into the cyclohexanol form. The progress of the reaction will be gauged using run TLC of aliquots of the reaction at separate time intervals using a 35%: 65% acetone to hexanes eluent system. The final product of the reaction will be separated and purified via extraction using two separate portions of 10 mL of hexanes.

1. **Theory:** What is the mechanism for the following reaction?

   \[
   \text{OH} \quad \text{NaOCl, CH}_3\text{CO}_2\text{H}, \quad \text{acetone, } \Delta \quad \text{O}
   \]

2. **Objective:** Now that you have provided the mechanism above, what are the reducing and oxidizing agents of the reaction? Why?
3. **Lab Techniques (TLC):** You want to determine if the reaction specified in question one was successful in oxidizing the reactant into the cyclohexanone product. To do this you run a TLC of the product mixture against a standard of the reactant. When you perform the TLC where would you expect to see the theoretical product on the plate?

   A) The product would be higher on the plate the standard
   B) The product would be lower on the plate than the reactant
   C) Not enough information is given
   D) Both spots would appear at the same level

4. **Lab Techniques (TLC):** Using again TLC you want to see if the oxidation of the reactant went to completion. You run a cospot TLC plate and the results are displayed below

   ![TLC Diagram]

   a. What does lane A represent?
   b. What does lane B represent?
   c. What does lane C represent?
   d. Did the reaction go to completion? If so how do you know?