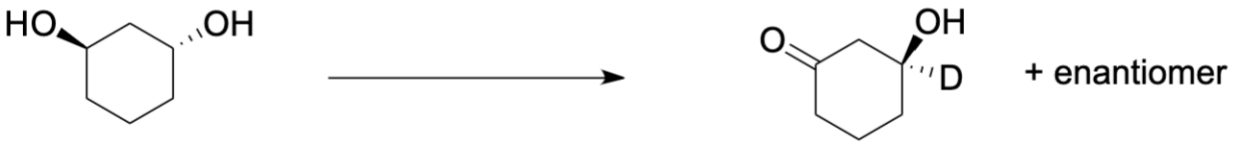
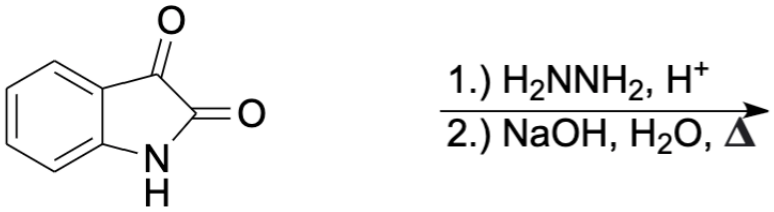
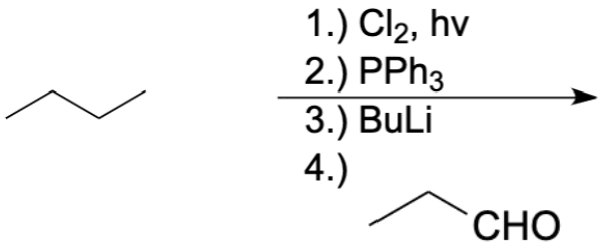
**Carbonyls #4: Rxns Practice of Ketones & Aldehydes, Part 2—Making Them Harder.**

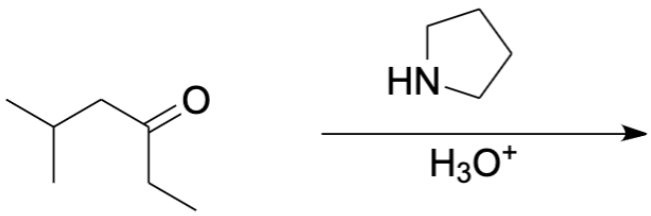
Ok, gang. In the last worksheet, I wanted to give you some straight forward practice, helping you get more acquainted with all of these new carbonyl related reactions. But now, it's time to crank the difficulty up a bit.

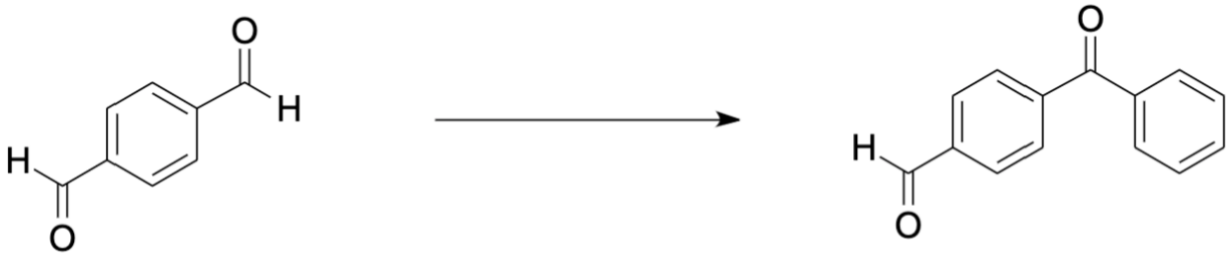
**1.)** Predict the major organic product:

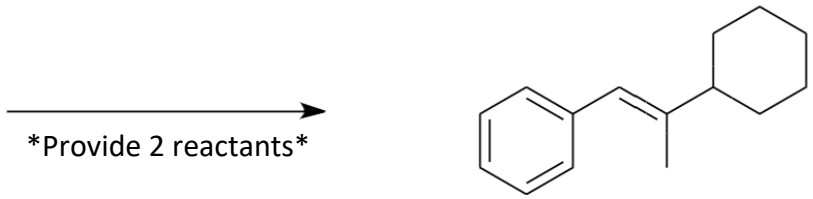


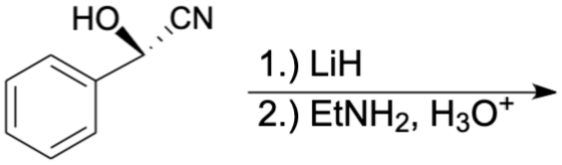



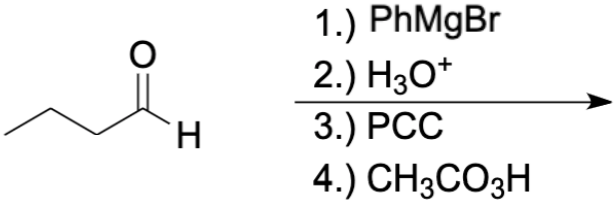





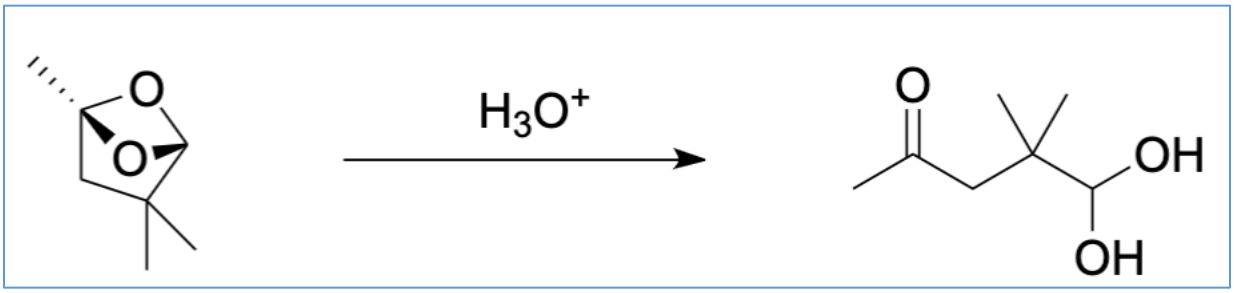

*Provide 2 reactants*


HO
CN
1.) LiH
2.) EtNH2, H3O+


1.) PhMgBr
2.) H3O+
3.) PCC
4.) CH3CO3H

**2.)** Okay, gang. Moving on from those complete the reaction questions, I have a mechanism for you. I know this looks whacky, but it's **just** reverse acetal formation. You got this.

Draw the arrow pushing mechanism for the reaction displayed below:



**3.)** And to wrap this worksheet up, I have a synthesis question for you

Provide an efficient synthesis of the target molecule, shown below, using organic sources with **4 carbons or less**.

Sources of 4 carbons
or less