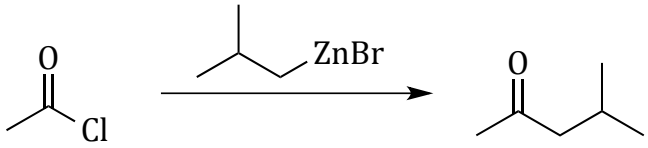
How Can We Add Only One Equivalent?

Show the overall mechanism for the reaction of a nucleophile (Nu:) with a generic carboxylic acid derivative.

What are two strategies for making sure that **only one equivalent** of the nucleophile is added?

Method 1:
Take Advantage of Relative Reactivity

Provide a complete curved-arrow mechanism for the following reaction:



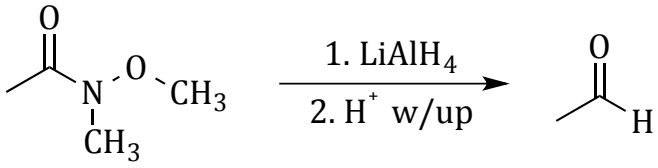
Why is no work-up step required for this reaction?

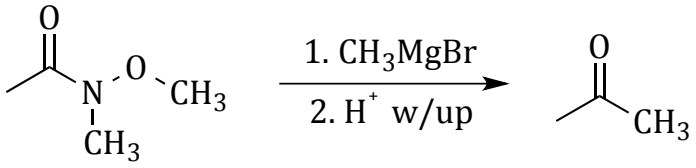
Are there *other* carbon nucleophiles that can be used for this reaction?

Reading: Section 21.10

Method 2: Form a Stable Tetrahedral Intermediate (Weinreb Amides)

Provide complete curved-arrow mechanisms for the following reactions:

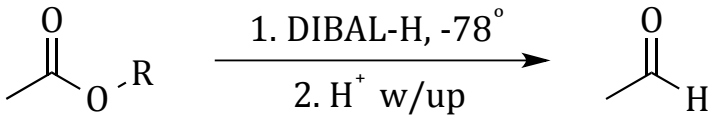




How can we prepare these **Weinreb Amides**?

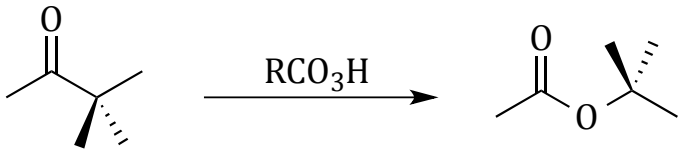
Method 2: Form a Stable Tetrahedral Intermediate (DIBAL-H)

Here's another reaction that produces a stable tetrahedral intermediate. Provide a complete curved-arrow mechanism.



Going Backward: Oxidizing Ketones
The Baeyer-Villiger Reaction

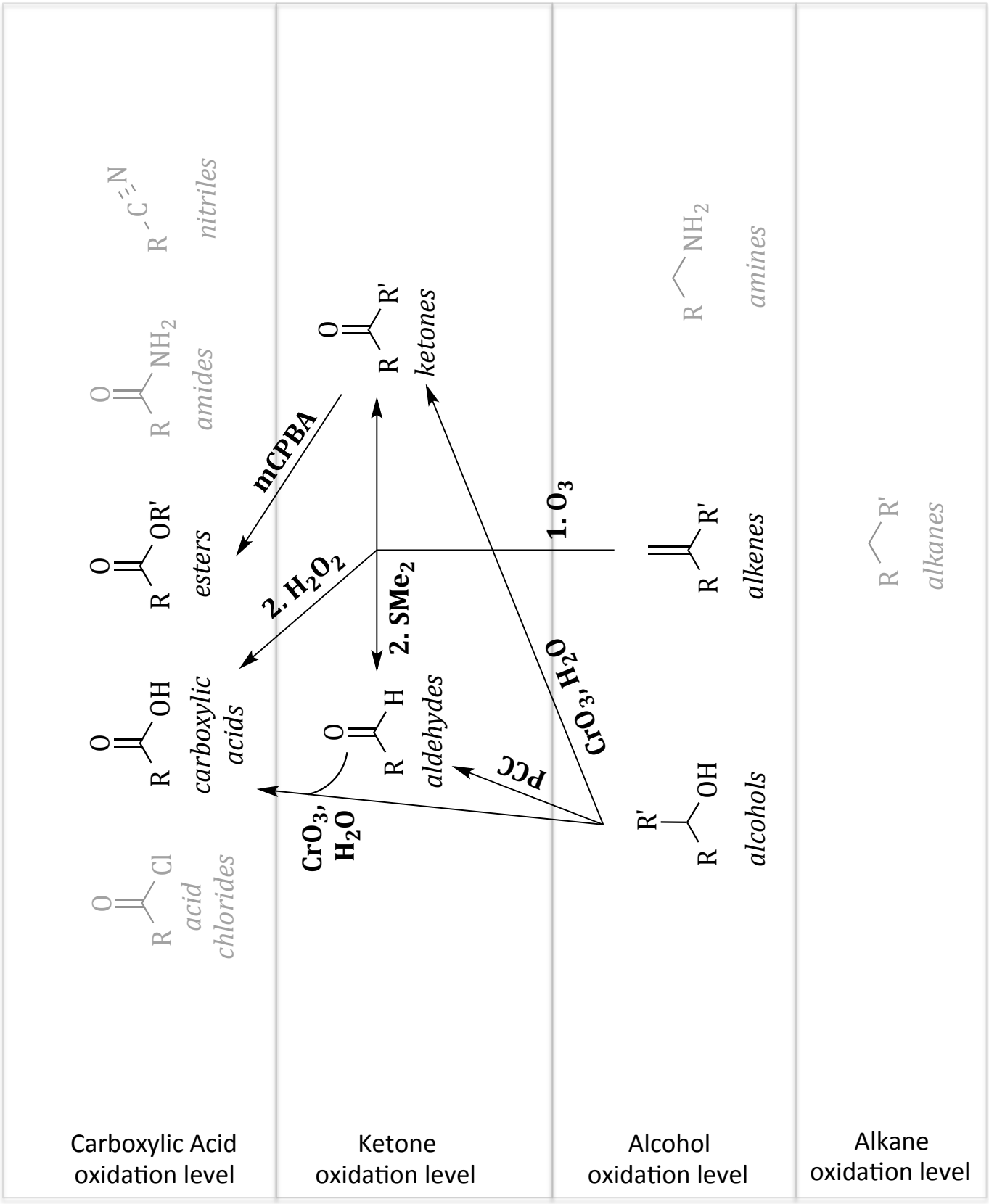
Provide a complete curved-arrow mechanism for the following reaction:



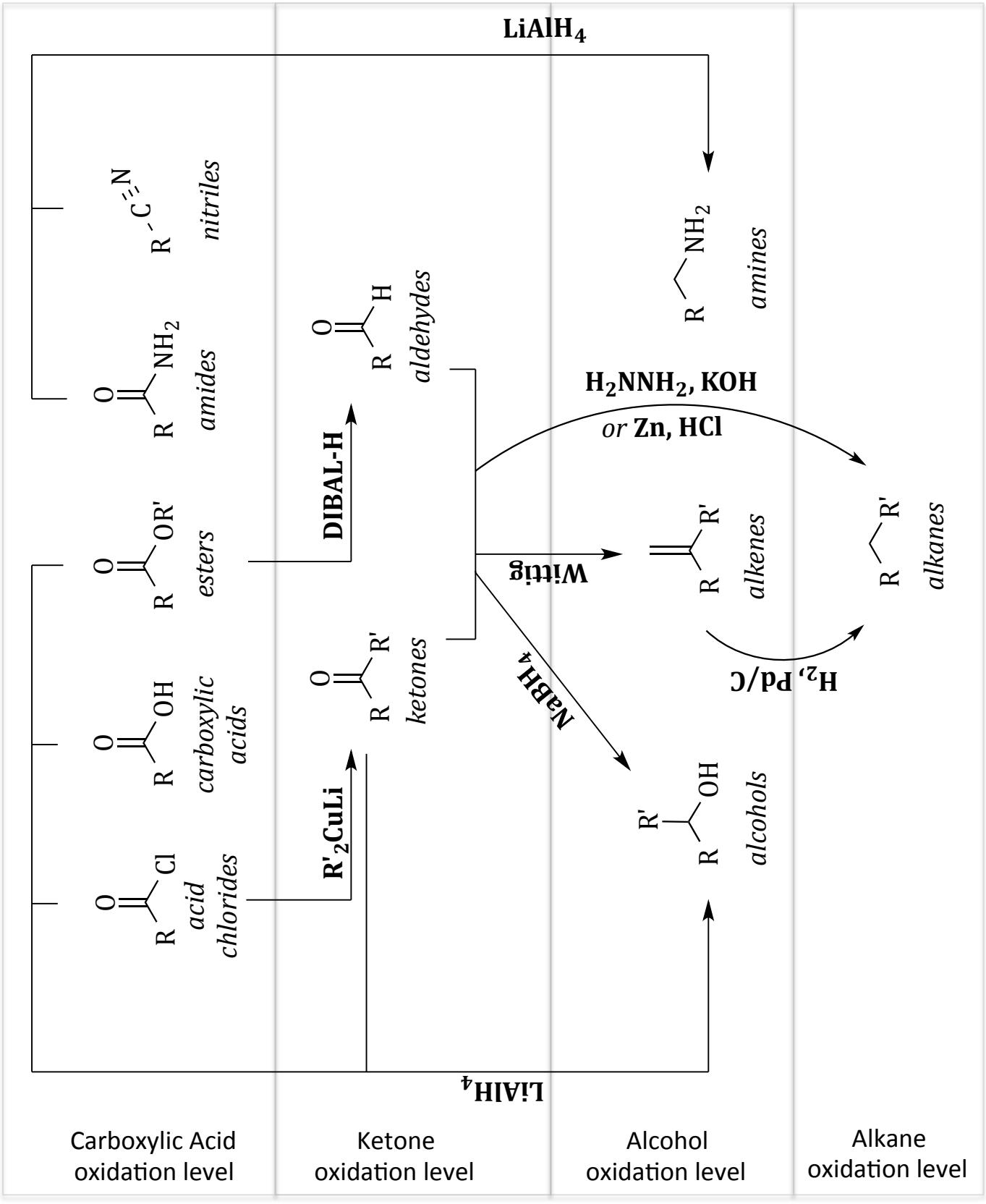
Have you seen the reagent "RCO_3H" before?

Which of the ketone's R groups will migrate in this reaction?

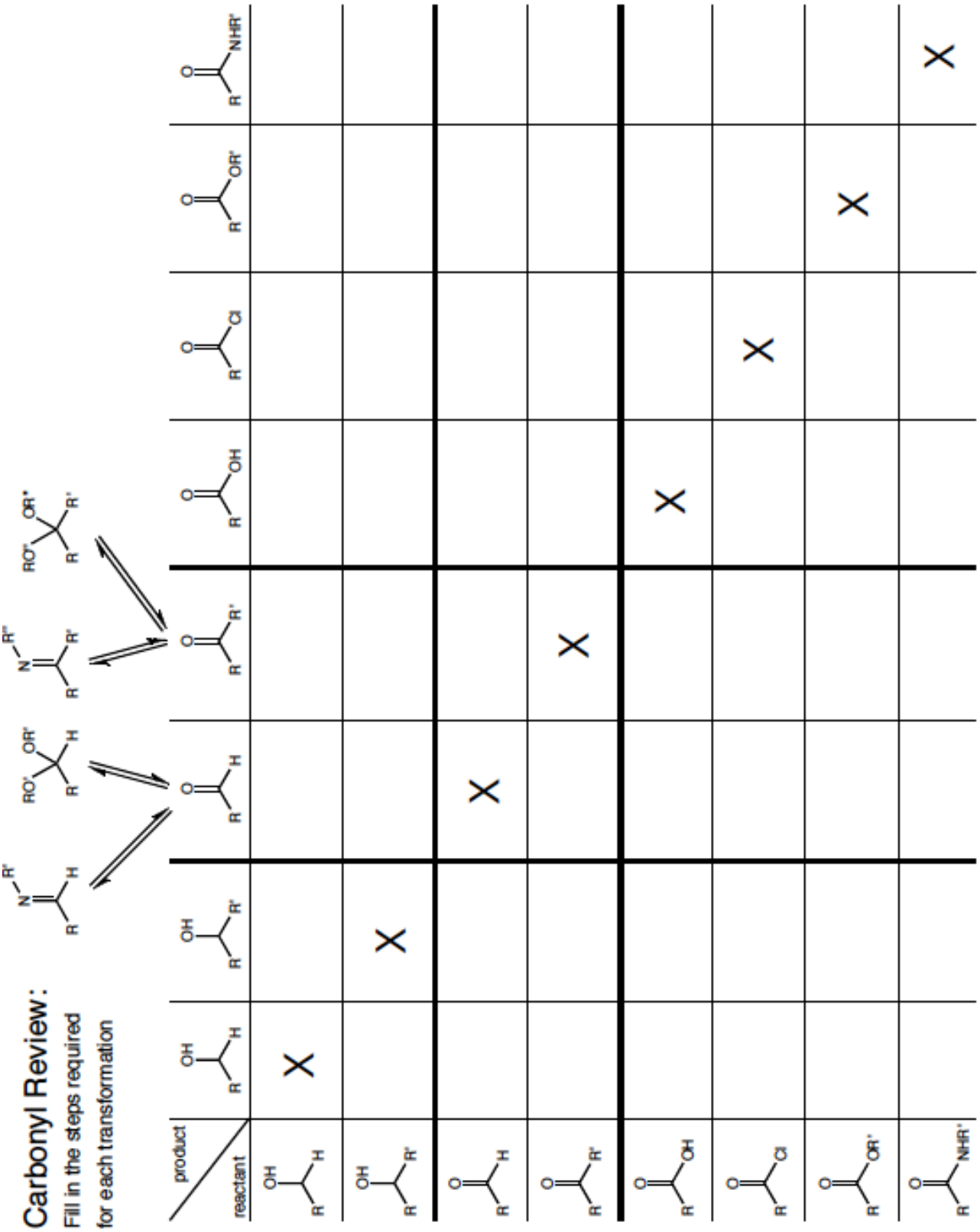
Putting It Together: Oxidative Carbonyl Chemistry



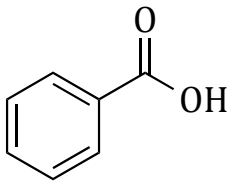
Putting It Together: Reductive Carbonyl Chemistry

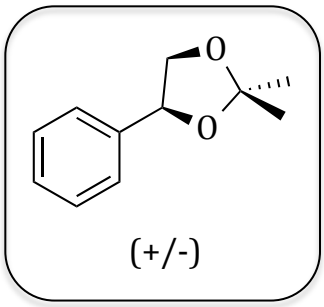


Putting It Together: The Grid of Carbonyl Love

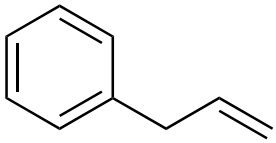


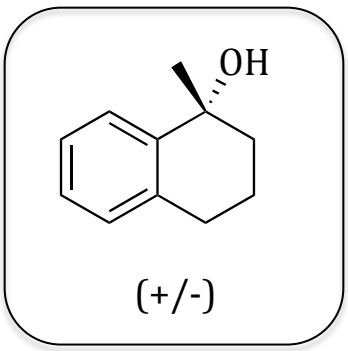
Provide a multi-step synthesis of the desired product from the indicated starting material. You may use any organic or inorganic reagents, but all of the carbons in the starting material must end up in the product. The best answer will require six or fewer steps.





Provide a multi-step synthesis of the desired product from the indicated starting material. You may use any organic or inorganic reagents, but all of the carbons in the starting material must end up in the product. The best answer will require eight or fewer steps.





Provide a multi-step synthesis of the desired product from the indicated starting material. You may use any organic or inorganic reagents that add *two or fewer* carbon atoms. The best answer will require four or fewer steps.