

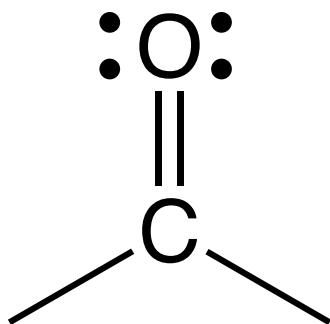
Differences Between the Reagents

Alkyl lithium Reagents

Grignard Reagents

Gilman Reagents ([Watch the Gilman Reagent video](#))

Functional Groups Such as Carbonyl Groups Undergo Characteristic Reactions



Here are the keys to understanding mechanisms in 320N!!

1) There are basically four different mechanism elements that make up the steps of carbonyl reactions.

A) Make a bond between a nucleophile and an electrophile

B) Break a bond to give stable molecules or ions

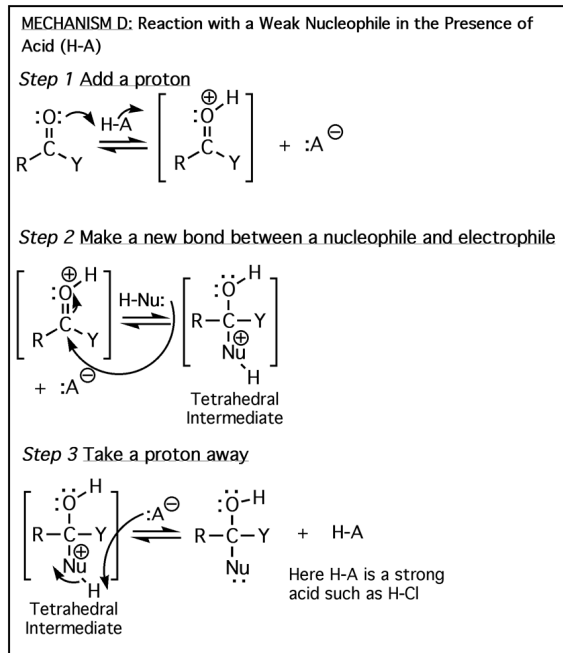
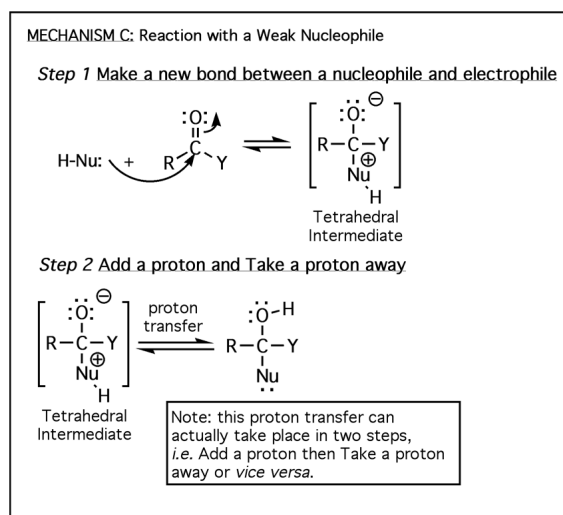
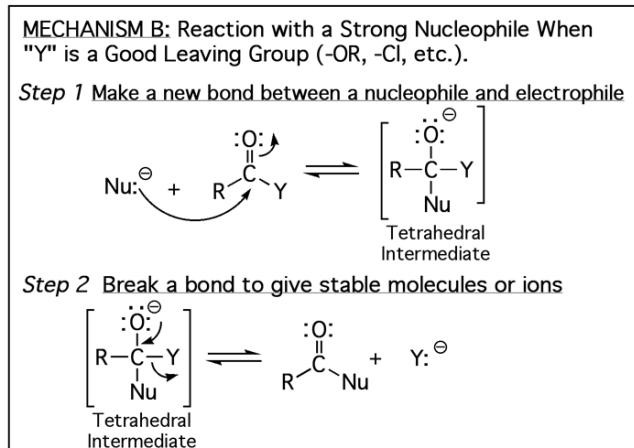
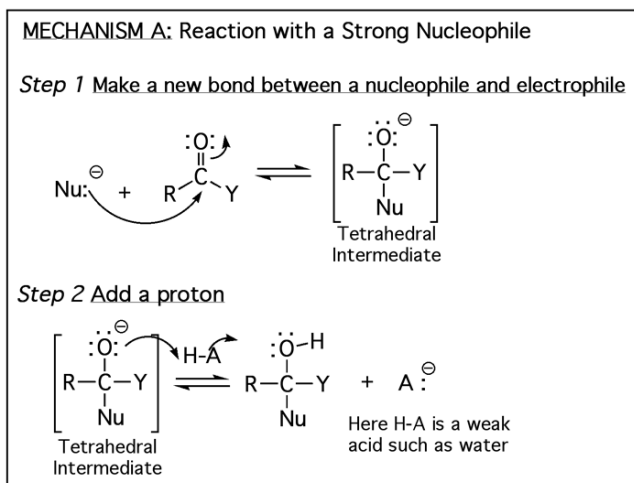
C) Add a proton

D) Take a proton away

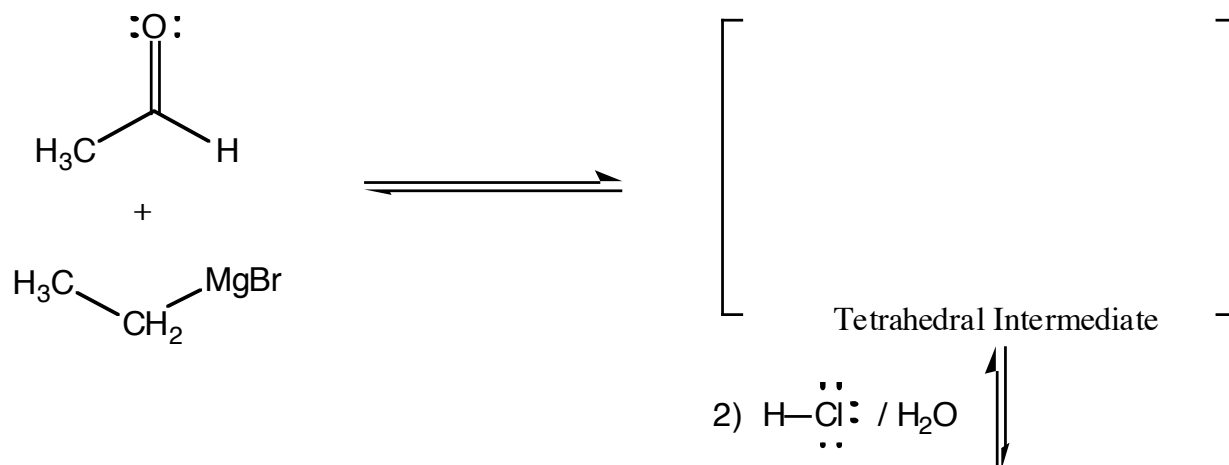
2) These same four mechanism elements describe most of the other mechanisms you have/will learn!!! (Yes, organic chemistry really is this simple if you look at it this way!!)

There are basically four different mechanisms that describe the vast majority of carbonyl reactions and these mechanisms are different combinations/ordering of the four mechanism elements listed above. In this class, I have termed them "Mechanism A", "Mechanism B", "Mechanism C", and "Mechanism D". They all involve a nucleophile attacking the partially positively charged carbon atom of the carbonyl to create a tetrahedral intermediate. Different reaction mechanisms are distinguished by the timing of protonation of the oxygen atom as well as the presence or absence of a leaving group attached to the carbonyl.

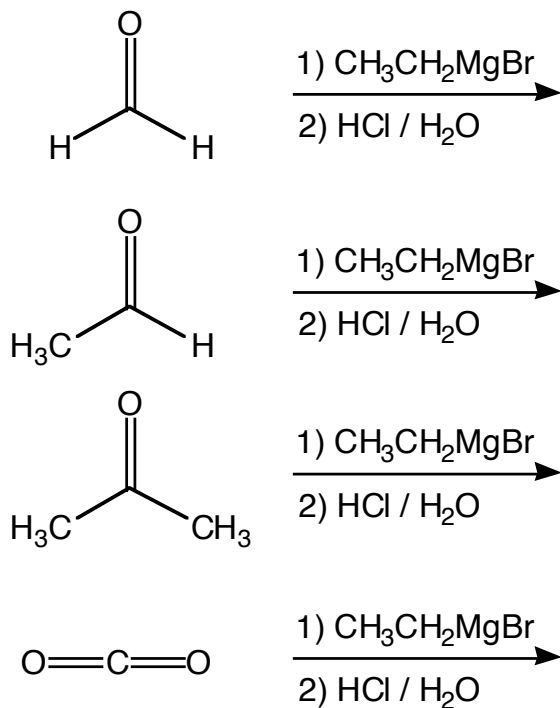
Four Mechanisms for the Reaction of Nucleophiles with Carbonyl Compounds



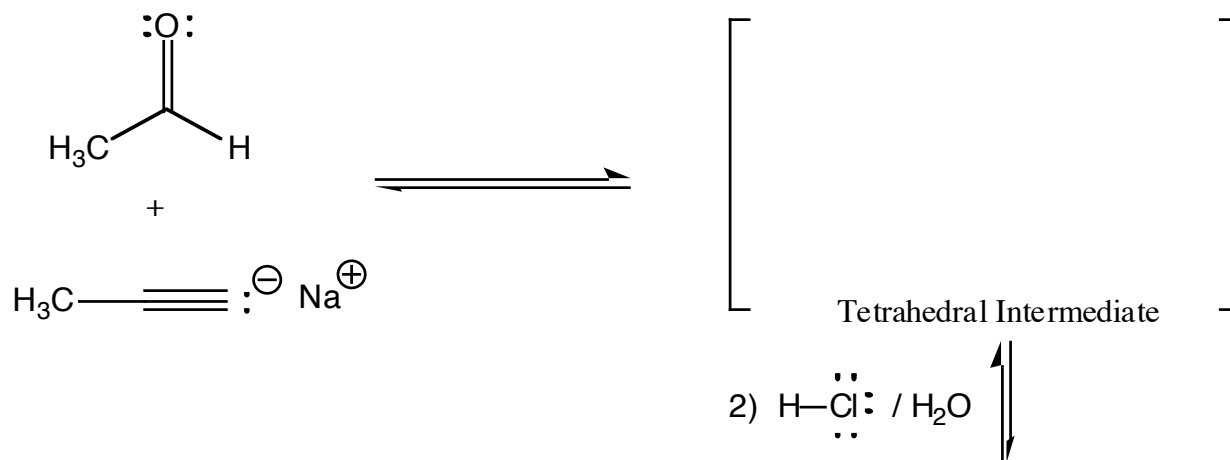
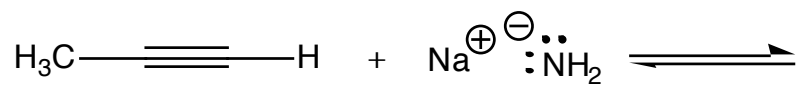
Grignard Reagent Reacting with an Aldehyde or Ketone



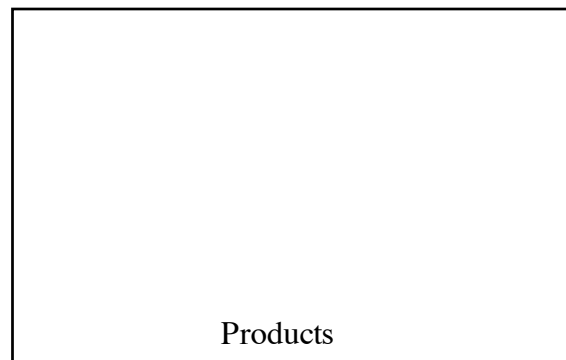
Key Recognition Element (KRE):



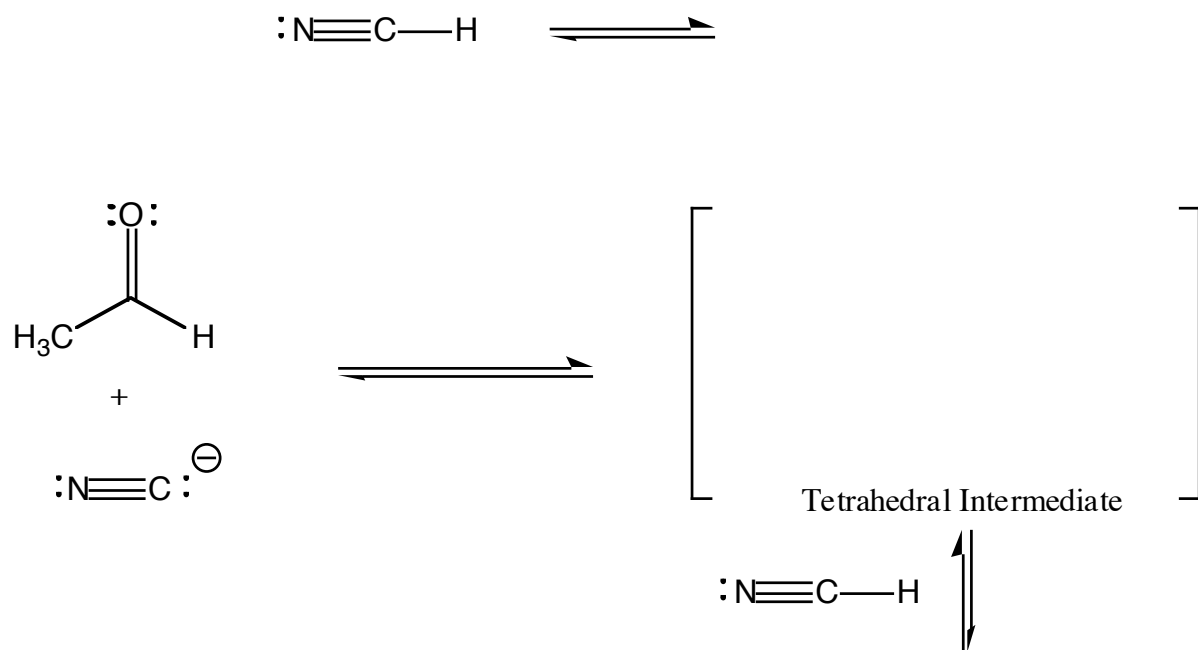
Alkyne Anion Reacting with an Aldehyde or Ketone



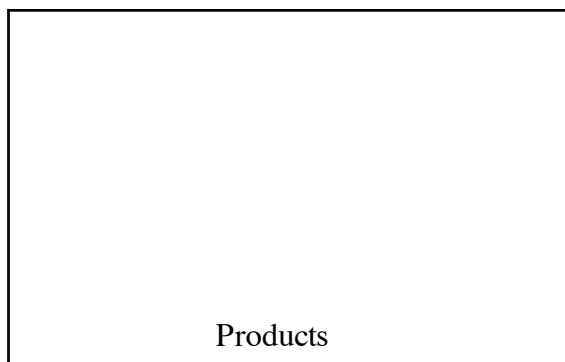
Key Recognition Element (KRE):



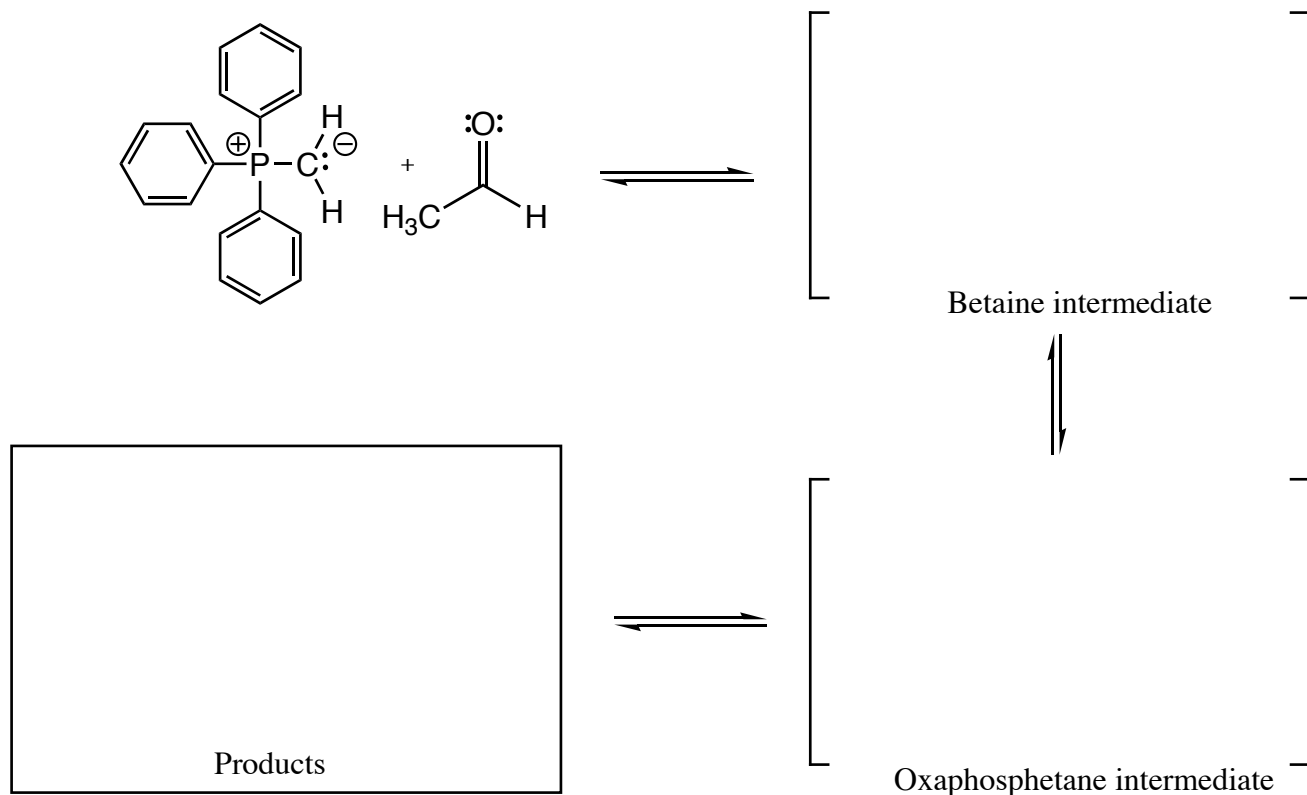
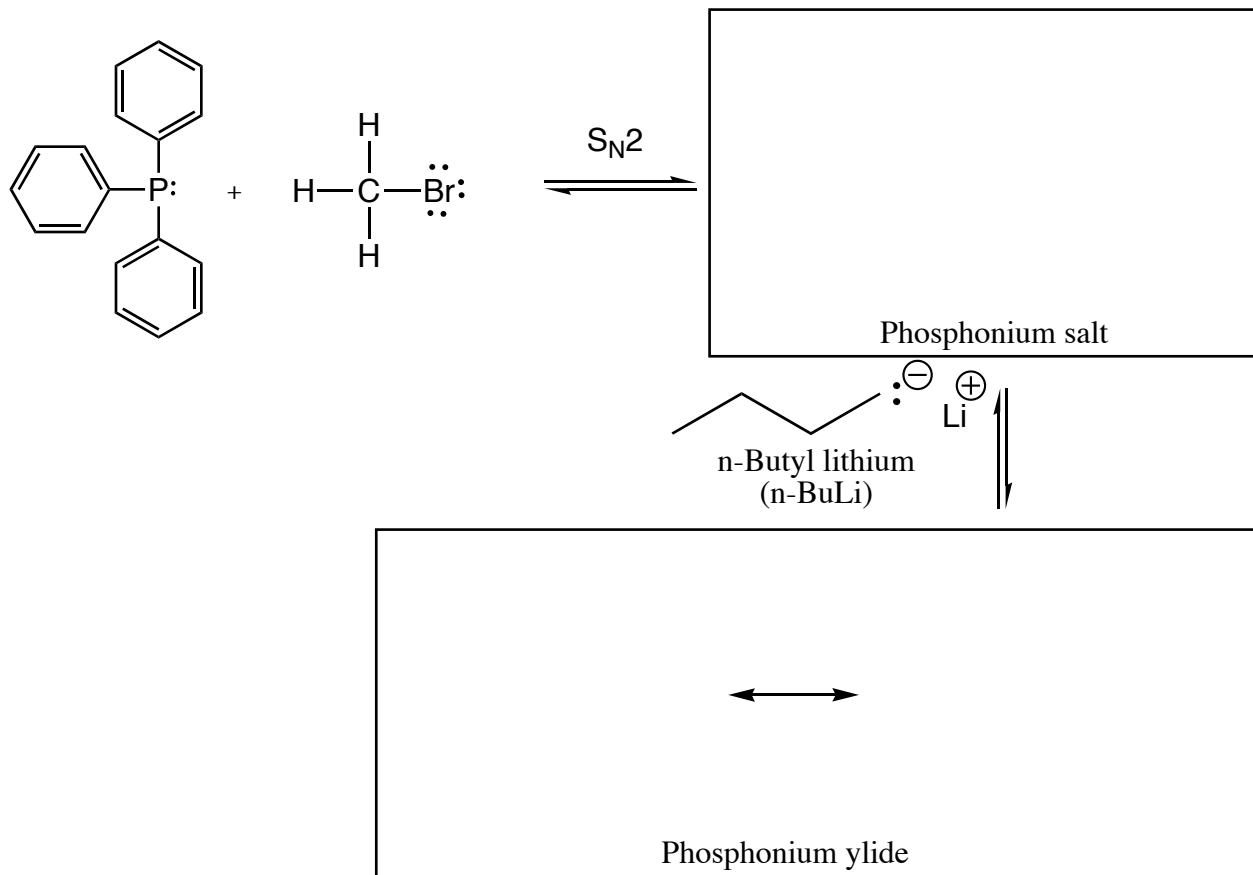
HCN Reacting with an Aldehyde or Ketone



Key Recognition Element (KRE):

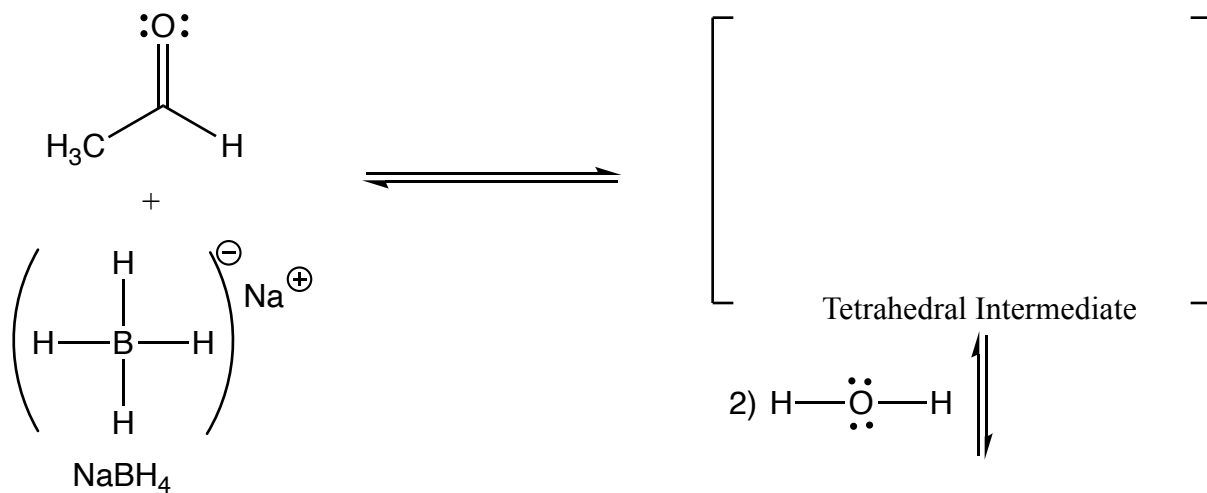


Wittig Reaction



Key Recognition Element (KRE):

Sodium Borohydride Reacting with an Aldehyde or Ketone



Key Recognition Element (KRE):

