

Exam 2

Nomenclature	10%
Concepts	33%
Mechanisms	17%
Reactions	36%
MCAT-style	4%

Epic New Reaction



A primary
haloalkane

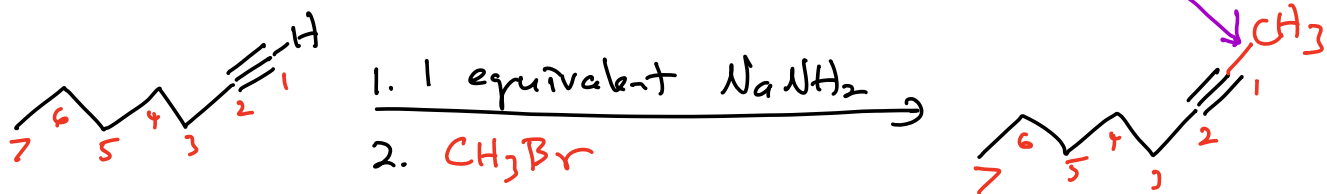
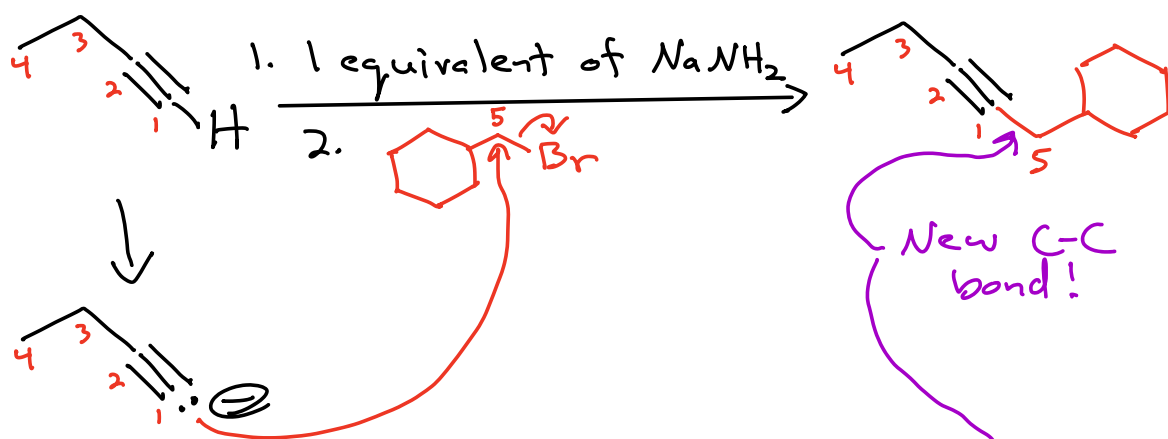


Time capsule: This is an $\text{S}_{\text{N}}2$ reaction. The haloalkane must be primary to avoid an $\text{E}2$ reaction.

Making C-C bonds allows us to construct larger molecules from smaller ones!

A major goal of organic synthesis

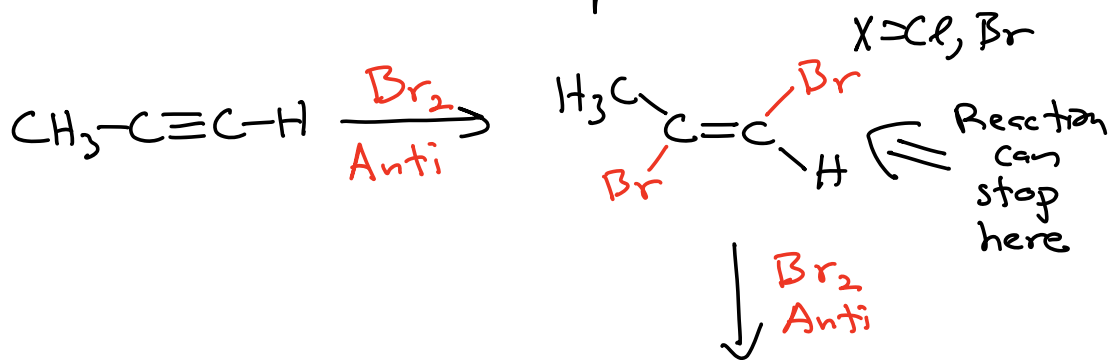
Example:



Alkynes \rightarrow The two orthogonal pi bonds define alkyne reactions

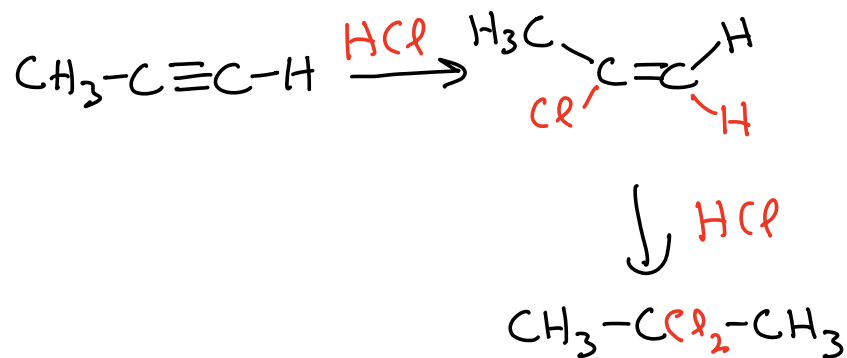
$R-C\equiv C-R$ \rightarrow Same overall personality as alkenes

A) Reaction with 2 equivalents of X_2



$CH_3-CBr_2-CHBr_2$
Vicinal tetrahalide
"on adjacent carbon atoms"

B) Reaction with 2 equivalents of H-X
X = Cl, Br



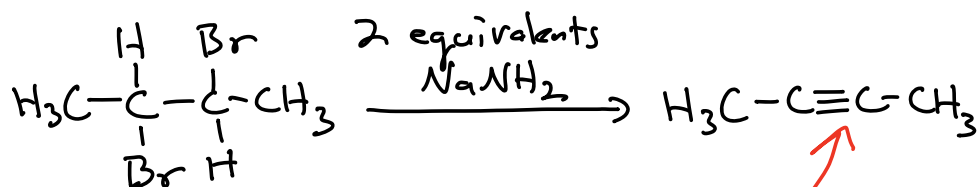
Mechanism involves a cation intermediate

⇒ Markovnikov's rule followed

However, the two X atoms always
end up on the same carbon



c) Conversion of a vicinal dihalide into an alkyne



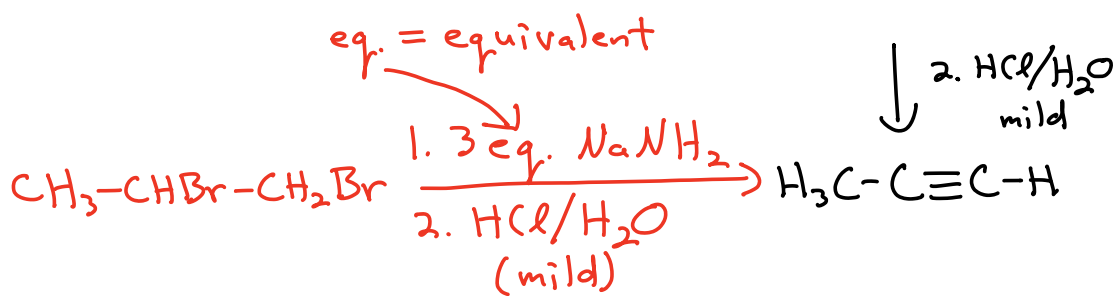
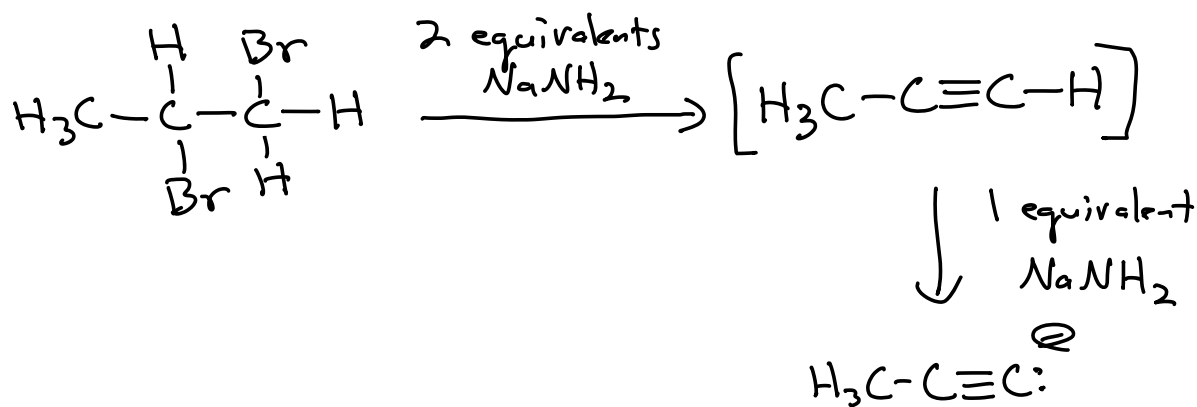
Vicinal dihalide

Note this alkyne is not terminal
(it is not on the end)



Time capsule → This is a double E2 reaction

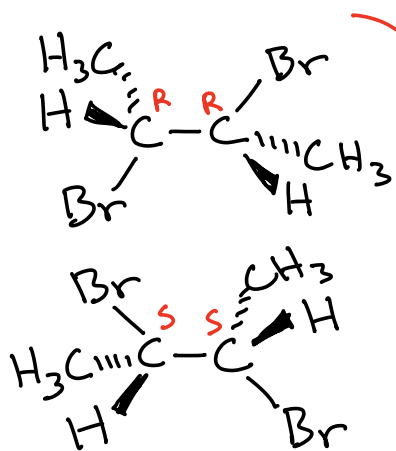
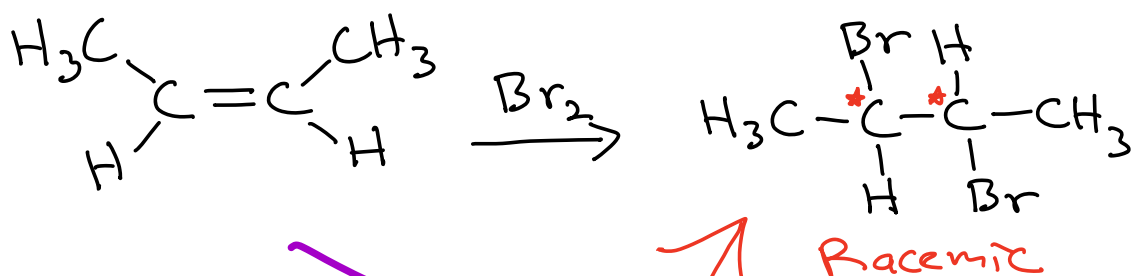
When creating a terminal alkyne you must use 3 equivalents of NaNH_2 as a first step \rightarrow AND \rightarrow you need a second step that is mild acid $\rightarrow \text{HCl}/\text{H}_2\text{O}$



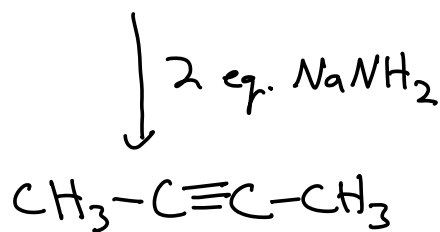
Internal alkyne example:



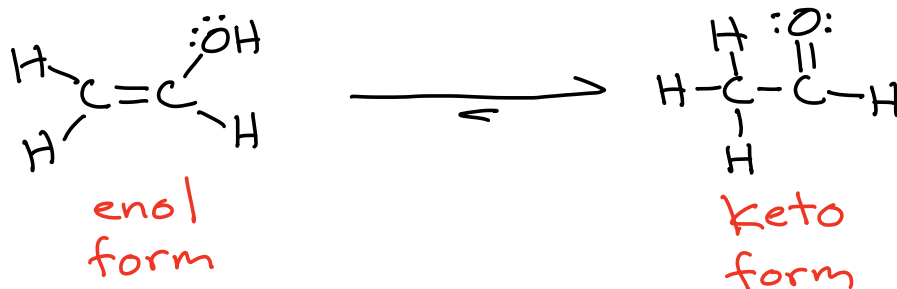
Big Deal → allows
conversion of an alkene
to an alkyne



Racemic



New Concept → The following species are in equilibrium, and the more stable species is the "keto" form

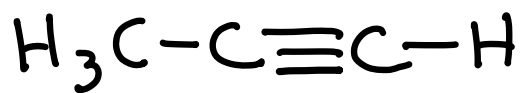
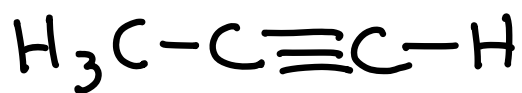
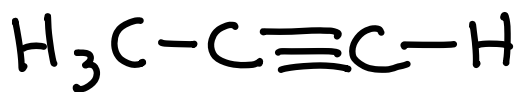
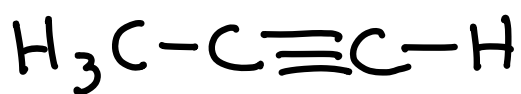
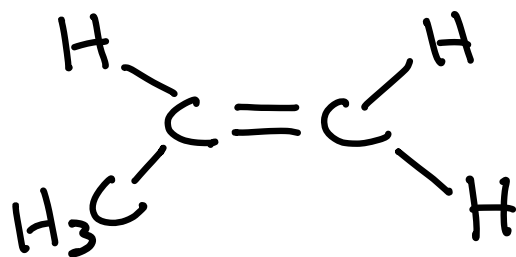
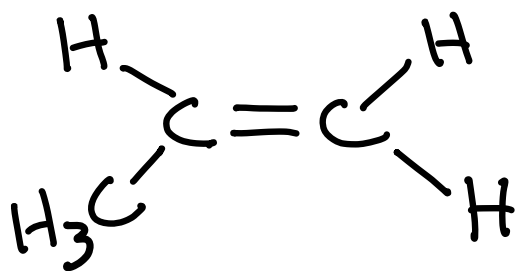


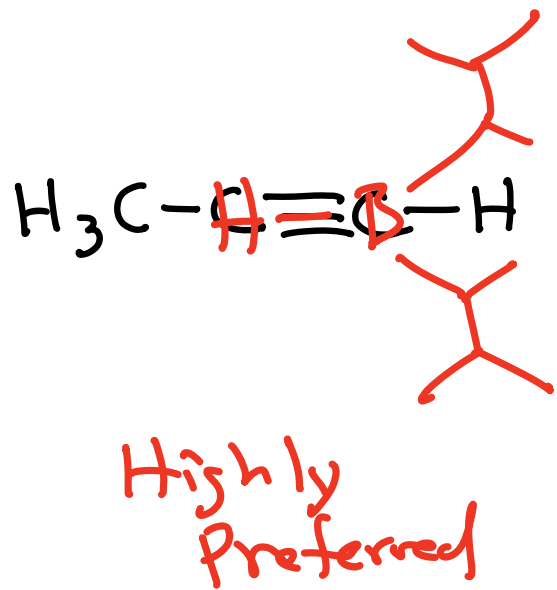
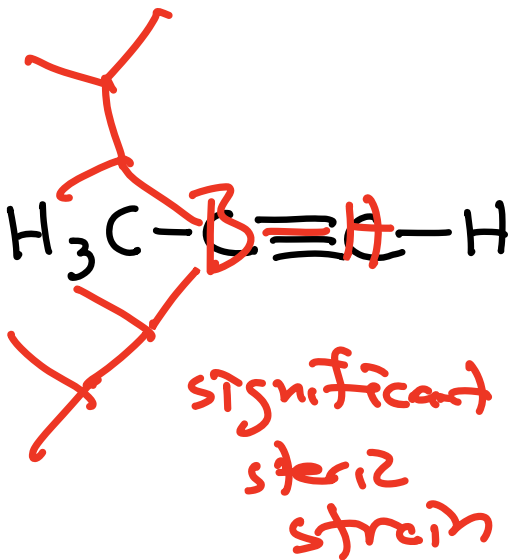
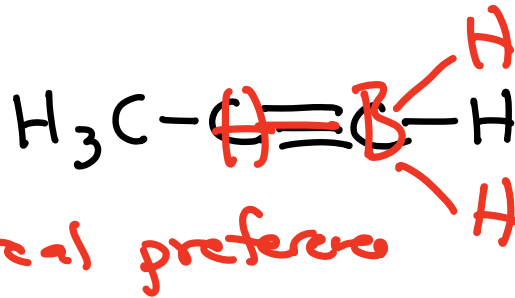
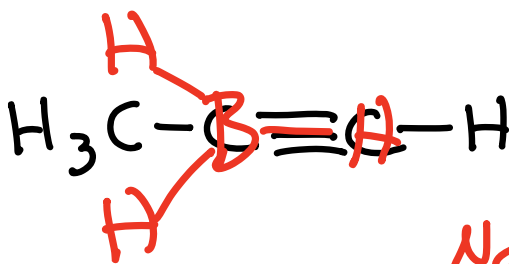
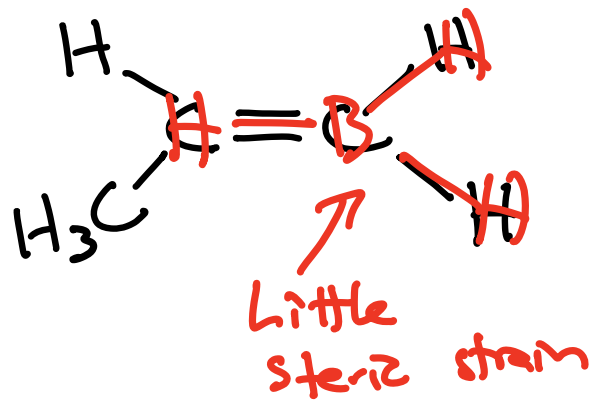
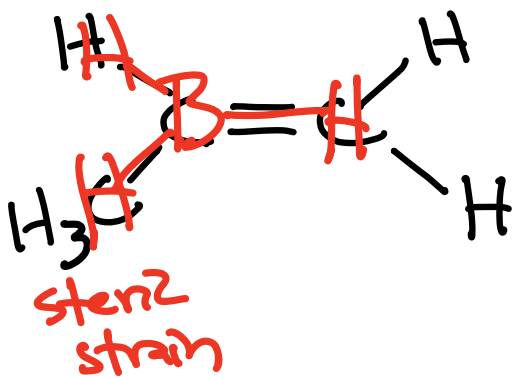
This process is called "tautomerization" as in "keto-enol tautomerization"

Favored
(a C=O pi bond is stronger than a C=C pi bond)

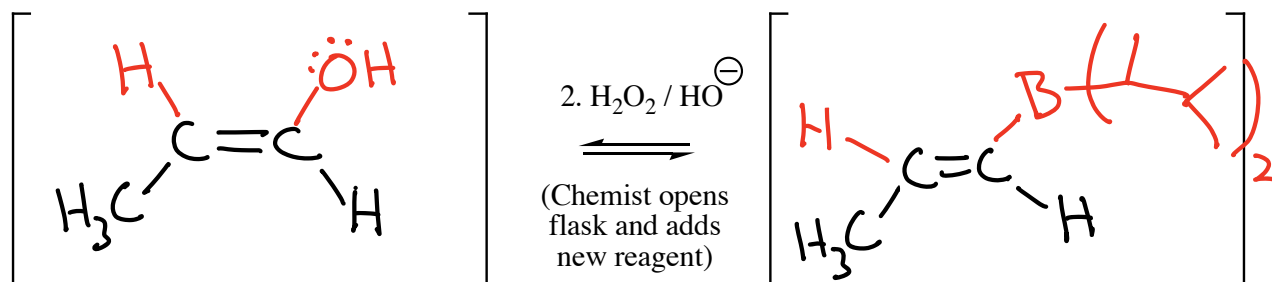
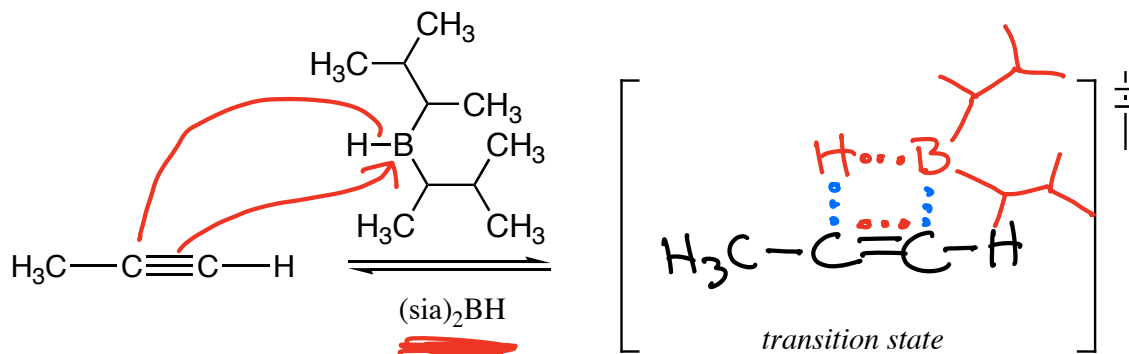


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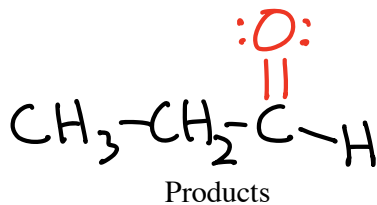




Terminal Alkyne Hydroboration



Keto-enol
tautomerization



\Leftarrow The C=O is on the C on the end \rightarrow
 "non-Markovnikov"

Summary:

Regiochemistry:

Stereochemistry:

Example:

