most stable conformation has the anti arrangement of $H + Br$

$\Rightarrow$ fast

molecule must undergo an unfavorable conformational change before anti to the $Br$.

$\Rightarrow$ v. slow

Neither $H$ is change before anti to the $Br$. It can react, elimination won't go.
Consider: cis + trans 2-methyl-1-bromo cyclohexane

\[
\text{Br} \quad \text{CH}_3 \quad \xrightarrow{\text{NaOH} \quad \text{EtOH} \quad \Delta} \quad \text{expect}
\]

Add in stereochemistry

**cis:**

\[
\text{Br} \quad \Delta \text{CH}_3
\]

**trans:**

\[
\text{Br} \quad \ldots \text{CH}_3
\]
Acid-Catalyzed Dehydration of Alcohols

(Close of H₂O)

Ease of dehydration: 3° > 2° > 1°

(85°) (180°)

Mechanism: E1

1. protonate OH (need a good LE)
2. H₂O leaves → cation
3. lose β H → alkene

\[ \text{H}_2\text{O} \quad \text{H}^+ \quad \text{O} \quad \text{H}^+ \quad \text{H}_2\text{O} \quad \Delta \quad \text{H}^+ \quad \text{alkene} \]

(Don't forget about rearrangement)

*This is the way that 3° + 2° alcohols react.*
What about $1^o$ alcohols? Theory #1: modified E1

\[ \text{H}^+ \xrightarrow{180^\circ} \text{H}^- \]

H\text{OH} \quad \text{simultaneous}

L6 leaves + carbon rear.

Theory #2: elim, reprototation $\text{H}^+$ another elimination

\[ \text{H}^+ \xrightarrow{\sim 100^\circ} \]

OH

H$^+$

H$_2$O
For alcohols:
3° + 2° - use E1 - cation intermediates rear. possible.
1° - often call it E2 but then reproatate allene. Alternative - modifed E1

For alkyl halides: Prefer E2 - need strong base
- concerted ren
- anti elimination
Synthesis of Alkynes:

1. Double dehydrohalogenation (loss of two equiv. of HX)

   a. from a vicinal dibromide

   \[ \text{Br_2} \quad \text{CCL}_4 \quad \text{H} \quad \text{Br} \]
   \[ \text{NaNH}_2 \quad \text{mineral oil} \]
   \[ \Delta \]
   \[ \text{H} \quad \text{Br} \]
   \[ \xrightarrow{\text{E2}} \]

   a vinyl bromide

b. from a geminal dichloride

   gem - "trans" - on same C