

Vicinal  
Tetrahalides

Geminal  
Dihalides

Alkynes

Aldehydes,  
Ketones

Vicinal  
Dihalides

Vicinal  
Diols

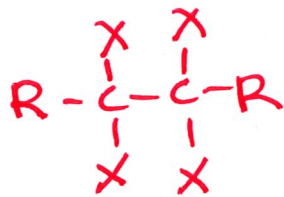
Alkenes

Alcohols

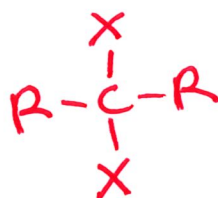
Haloalkanes

Halohydrins

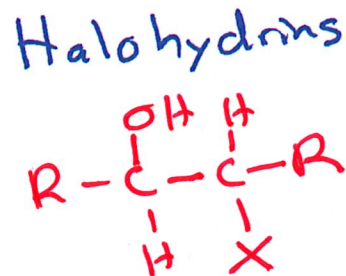
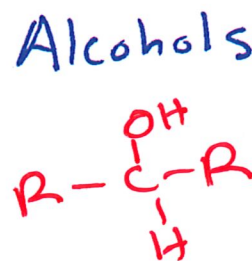
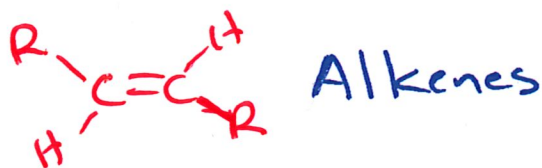
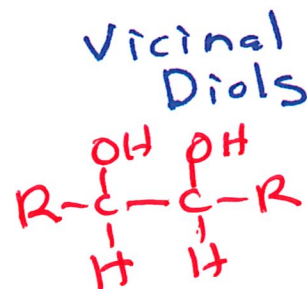
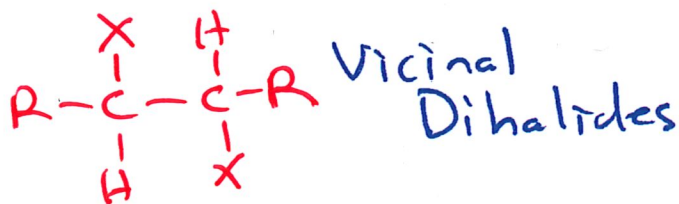
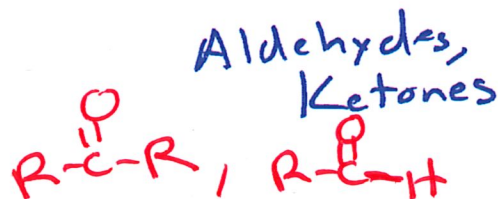
Alkanes



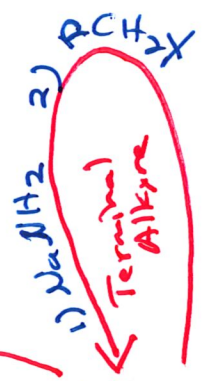
Vicinal ← "adjacent atoms"  
Tetrahalides



Geminal ← "same atom"  
Dihalides



Makes a C-C bond!!



Vicinal Tetrahalides

2 HX Markov.  $\rightarrow$  terminal alkynes  
Geminal Dihalides

Alkynes

2  $\text{NaNH}_2$   $\leftarrow$  internal alkyne  
1) 3  $\text{NaNH}_2$  2)  $\text{H}_2\text{O}$   $\leftarrow$  terminal alkyne

1)  $(\text{sia})_2\text{BH}$  2)  $\text{H}_2\text{O}_2/\text{HO}^\ominus$   
non-Markov.

Aldehydes, Ketones

$\text{H}_2\text{SO}_4/\text{H}_2\text{SO}_4/\text{H}_2\text{O}$  Markov.

1)  $\text{O}_3$  2)  $(\text{CH}_3)_2\text{S}$   
C=C bond breaks!!

Vicinal Dihalides

Vicinal Diols

1)  $\text{OsO}_4$  2)  $\text{NaHSO}_3$   
Syn

1)  $\text{BH}_3$  2)  $\text{H}_2\text{O}_2/\text{HO}^\ominus$   
non-Markov. Syn

Alcohols

$\text{H}_2\text{O}, \text{H}_2\text{SO}_4$  (cat.)

Markov. Mixed

1)  $\text{H}_2(\text{OAc})_2/\text{H}_2\text{O}$  2)  $\text{NaBH}_4$   
Markov. (no rearrangement) Mixed

Alkenes

HX Markov. Mixed  
Haloalkanes

$\text{OH}, \text{H}_2, \text{H}_2\text{O}$   
end up on more substituted C atom  
Anti  
Halohydrins

Alkanes

E Alkene Anti

Syn  
Lindlar's catalyst  
syn

Syn

$2 \text{H}_2$   
 $\text{Pd}, \text{Pt}, \text{or Ni}^\ominus$

$\text{H}_2$  and  $\text{Pt}^\ominus, \text{Pd}^\ominus, \text{Ni}^\ominus$