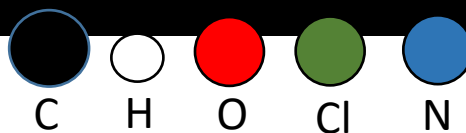
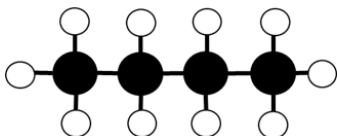
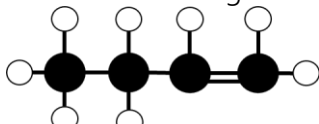
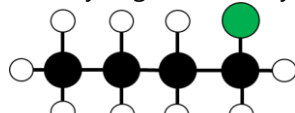
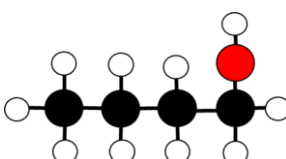
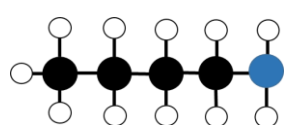
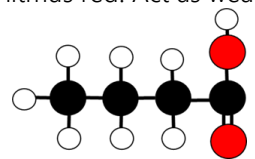
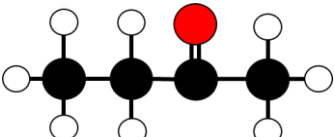
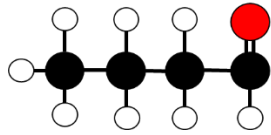
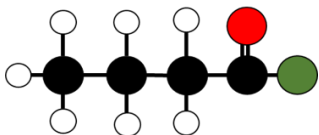


# Summary Notes

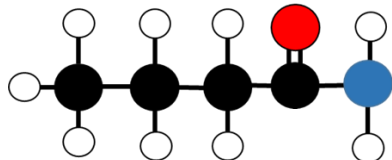


1. Functional groups – Naming and properties: Alkanes, alkenes, haloalkanes (primary, secondary, tertiary), alcohol, amines, carboxylic acids, Aldehydes, ketones, acids chlorides, amides and esters

<h2>Alkanes</h2> <ol style="list-style-type: none"> <li>1. Identify the longest C chain</li> <li>2. Identify any branches</li> <li>3. Number the C atoms in longest chain so branches are on the lowest numbers</li> <li>4. Location of branch</li> <li>5. Name of branch</li> <li>6. Prefix of long chain</li> <li>7. -ane</li> </ol> <p>Non-polar with ID-ID bonding only and insoluble.</p> 	<h2>Alkenes</h2> <ol style="list-style-type: none"> <li>1. Location of branch</li> <li>2. Name of branch</li> <li>3. Prefix of long chain</li> <li>4. Location of C=C</li> <li>5. -ene</li> <li>6. If in an alkene there are more than one double bond is present, it named as a -diene or -triene.</li> </ol> <p>Also Non-polar with ID-ID bonding only and insoluble. BP and MP increase with chain length</p> 	<h2>Haloalkanes</h2> <p>Halogen named as a branch        Bromine – bromo        Chlorine – chloro        Fluorine – fluoro        Iodine-iodo</p> <p>primary (1°) – bonded to a C that is bonded to only 1 other C        secondary (2°) – bonded to a C that is bonded to 2 other C        tertiary (3°) – bonded to a C that is bonded to 3 other C        Polar with only slight solubility</p> 
<h2>Alcohols</h2> <ol style="list-style-type: none"> <li>1. Location of branch</li> <li>2. Name of branch</li> <li>3. Prefix of long chain</li> <li>4. an-</li> <li>5. Location of OH (if multiple di, tri, tetra)</li> <li>6. -ol</li> </ol> <p>Hydrogen bonding, so higher BP and soluble</p> 	<h2>Amines</h2> <ol style="list-style-type: none"> <li>1. Identify the longest C chain</li> <li>2. Identify any branches</li> <li>3. Number the C atoms in longest chain so number Carbon 1 attached to amino group (NH<sub>2</sub>)</li> <li>4. Location /Name of branch</li> <li>5. Amino-</li> <li>6. Prefix of long chain</li> <li>7. -ane</li> </ol> 	<h2>Carboxylic acids</h2> <ol style="list-style-type: none"> <li>1. Longest -C chain with -COOH</li> <li>2. Identify branches</li> <li>3. No. 1 C is the C in -COOH</li> <li>4. Location of branches</li> <li>5. Name branch</li> <li>6. Prefix</li> <li>7. -anoic acid</li> </ol> <p>Turn blue litmus red. Act as weak acids</p> 
<h2>Ketones</h2> <p>Suffix is "-one", and indicating which carbon the =O is attached</p> 	<h2>Aldehydes</h2> <p>Aldehydes are named by changing "-e" at the end of the alkane to "-al".</p> 	<h2>Acid Chlorides</h2> <p>suffix is "-oyl chloride"        prefix is alkyl group including the carbon on the -COCl group</p> 

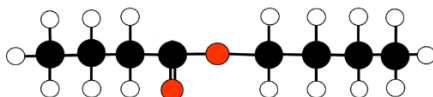
## Amides

1. The carbon attached to the  $\text{CONH}_2$  will be carbon 1
2. Number and name any branches
3. Name the longest C chain
4. Suffix – anamide



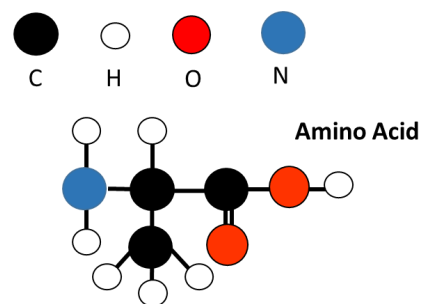
## Esters

1. Split between C-O bond
2. Identify name for side with  $-\text{O}-$
3. Prefix of C chain
4. -yl
5. Identify name for side with  $\text{C}=\text{O}$
6. Prefix of C chain
7. -anoate

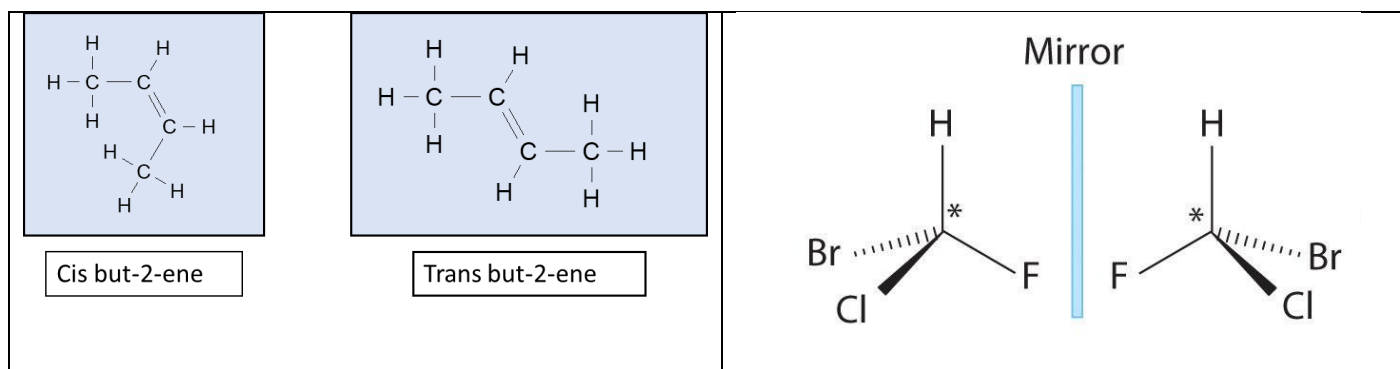


## Amino acids

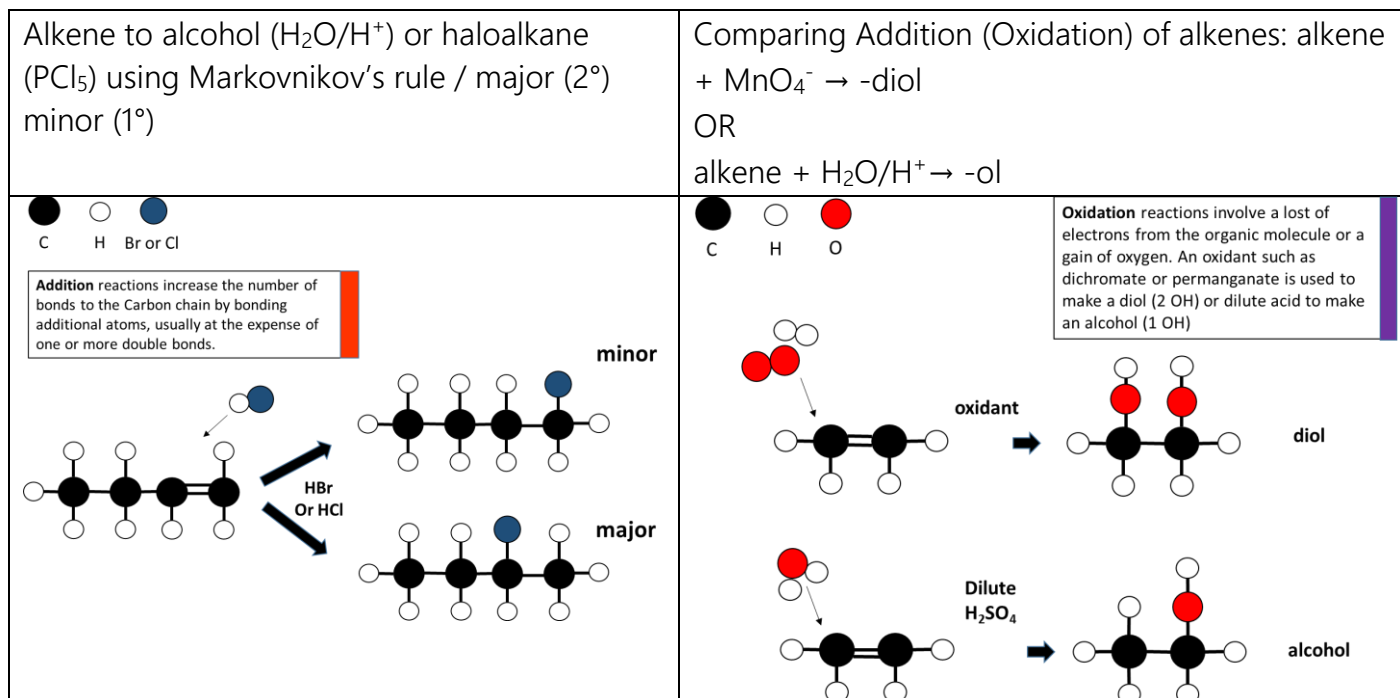
Do not need to name



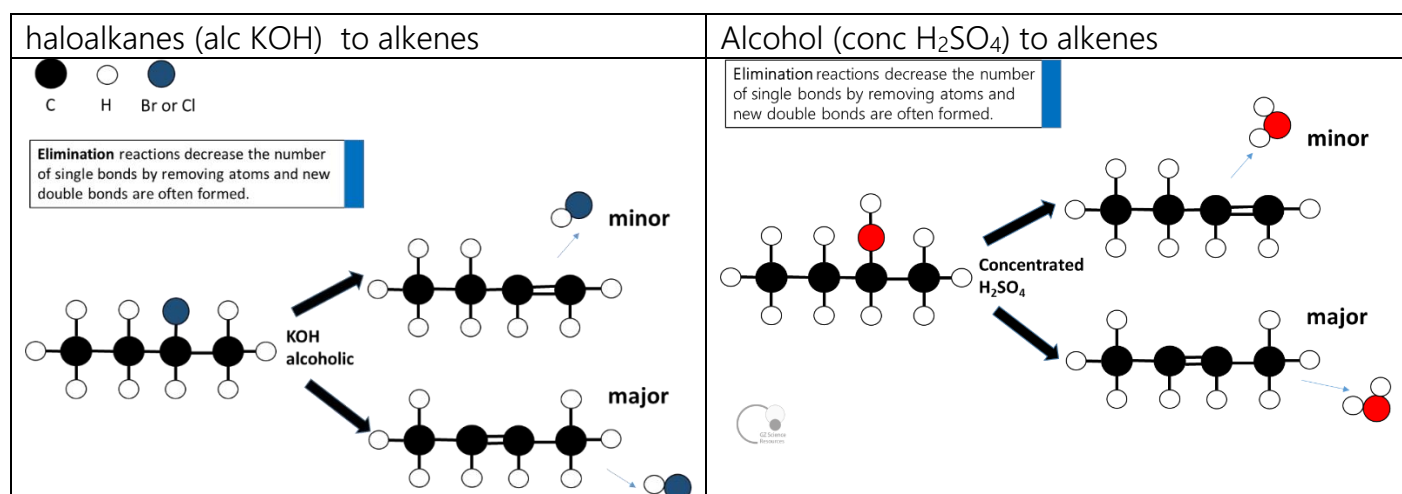
2. Isomers: cis/trans and optical isomers (enantiomers)



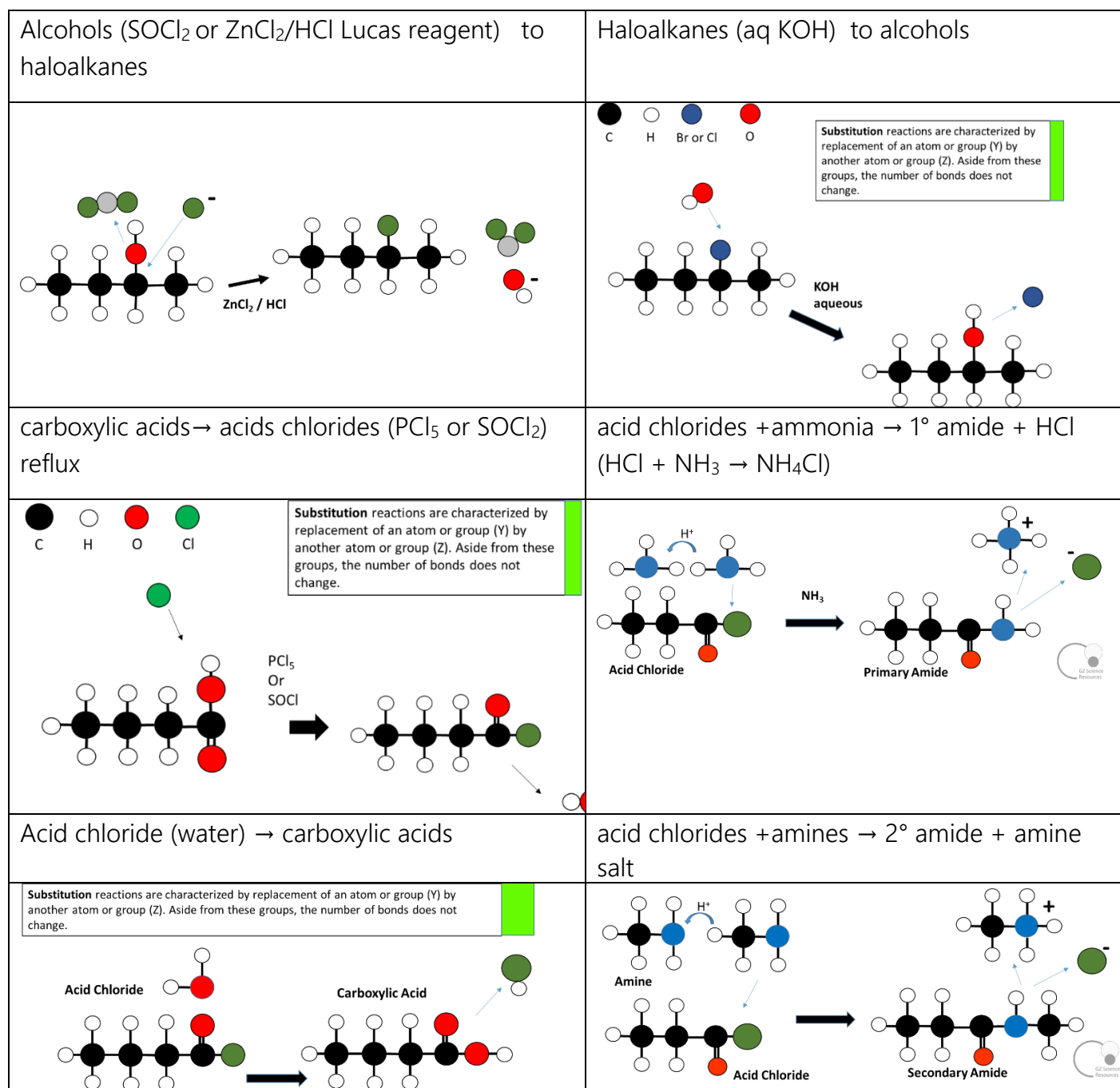
3. Addition reactions of alkenes:



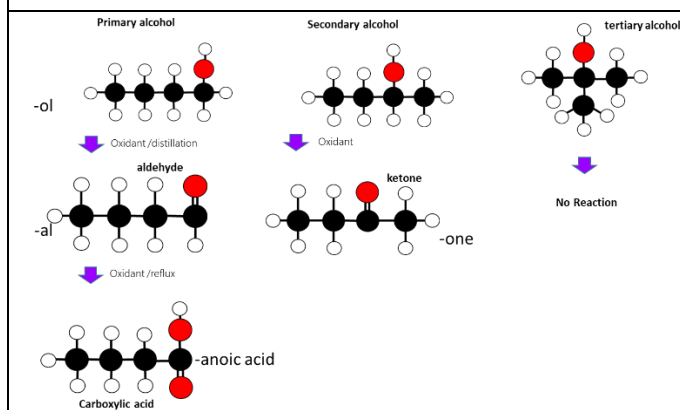
#### 4. Elimination reactions - Saytzeff's rule (poor get poorer) major (-2-) /minor (-1-)



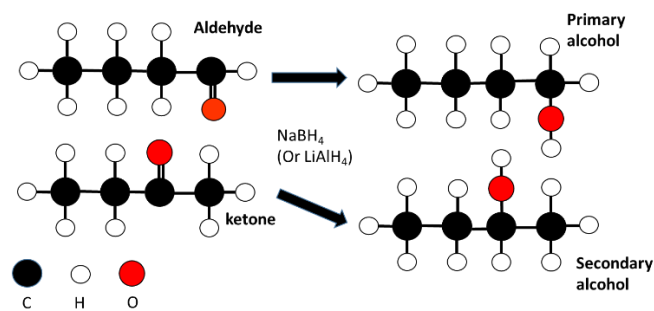
#### 5. Substitution reactions:



## 6. Oxidation reactions of alcohols:



## 7. Reduction reactions of aldehydes/ketones:



## 8. Distinguishing tests/redox equations: aldehyde positive for Tollens/Benedicts/permanganate

Testing Reagent	observations	
	Aldehyde $\text{R}-\text{C}(=\text{O})-\text{H}$	Ketone $\text{R}-\text{C}(=\text{O})-\text{R}'$
Potassium permanganate $\text{MnO}_4^-$ to $\text{Mn}^{2+}$	 Oxidises into carboxylic acid Purple to colourless	No reaction
Tollens' reagent $[\text{Ag}(\text{NH}_3)_2]^+$ to Ag	 Oxidise aldehydes (but not alcohols) Silver 'mirror' forms	No reaction
Benedict's solution $\text{Cu}^{2+}$ ions to $\text{Cu}^+$	 Oxidises aldehydes (but not alcohols) to form $\text{Cu}^+$ ions Red/brown ppt forms	No reaction

## 9. Acid/base reactions with Amines + Carboxylic acids

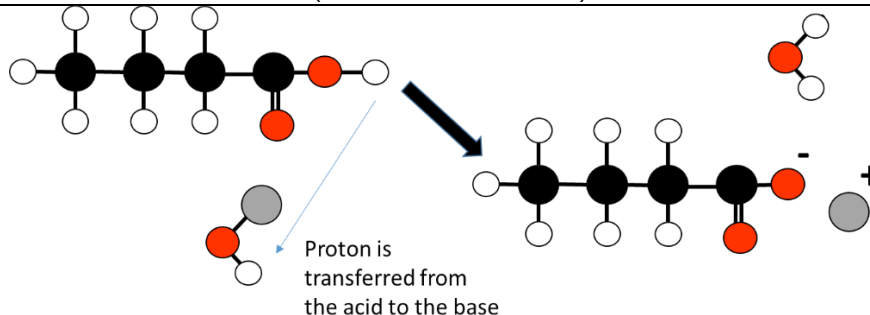
amine + water  $\rightarrow$  conjugate +  $\text{OH}^-$



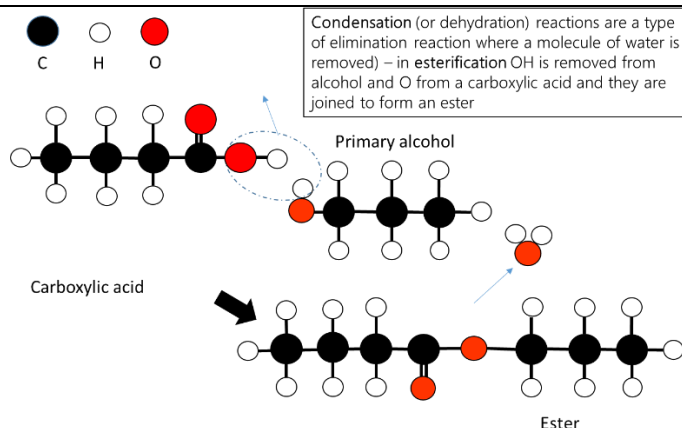
amine + acid  $\rightarrow$  salt + water



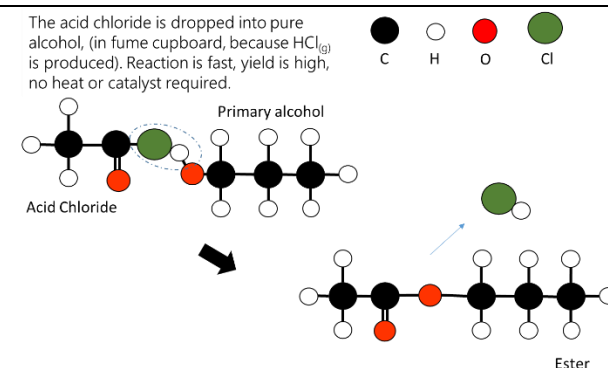
carboxylic acid + base  $\rightarrow$  salt + water (+  $\text{CO}_2$  if carbonate)



11. Esterification reactions: alcohol + carboxylic acid  $\rightarrow$  ester (conc  $\text{H}_2\text{SO}_4$ ) reflux with  $\text{Na}_2\text{CO}_3$  and anhydrous  $\text{MgSO}_4$



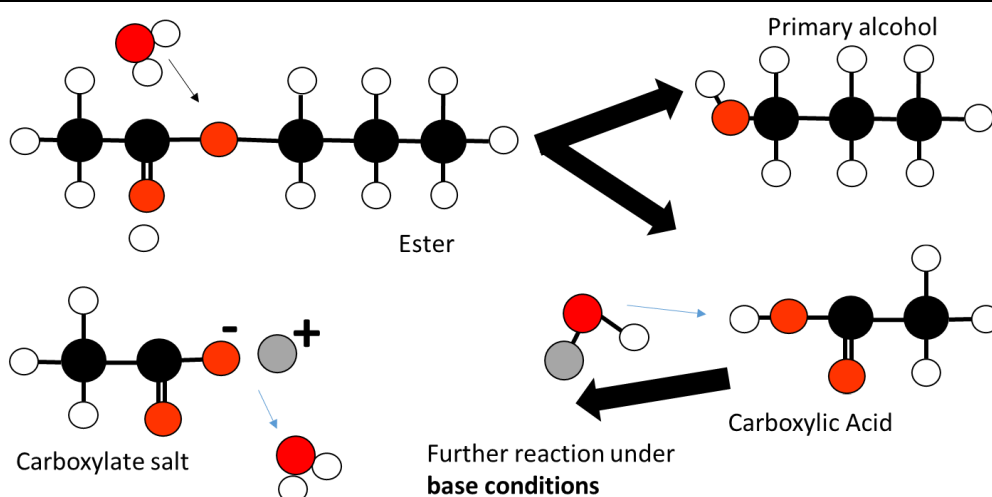
12. Esterification reactions of acid chlorides: acid chloride + alcohol  $\rightarrow$  Ester +  $\text{HCl}$



13. Hydrolysis reactions of esters:

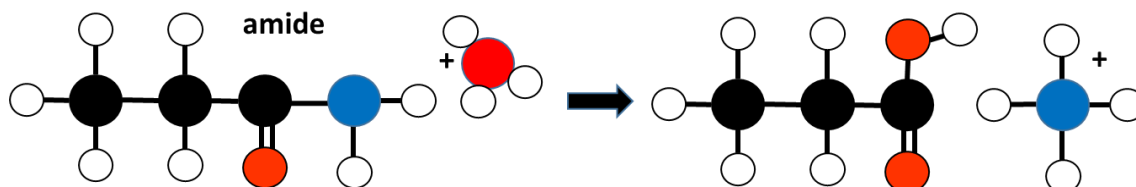
acid: ester  $\rightarrow$  alcohol + carboxylic acid

base: ( $\text{NaOH}$ ) ester  $\rightarrow$  alcohol + salt

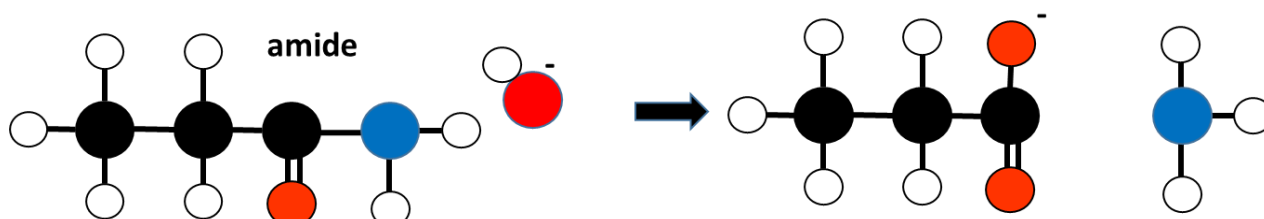


14. Hydrolysis reactions of amides:

acid: amide +  $\text{H}_3\text{O}^+ \rightarrow$  carboxylic acid +  $\text{NH}_4^+$



base: amide +  $\text{OH}^- \rightarrow$  carboxylate ion +  $\text{NH}_3$



dicarboxylic + diamides  $\rightarrow$  polyamide + water

