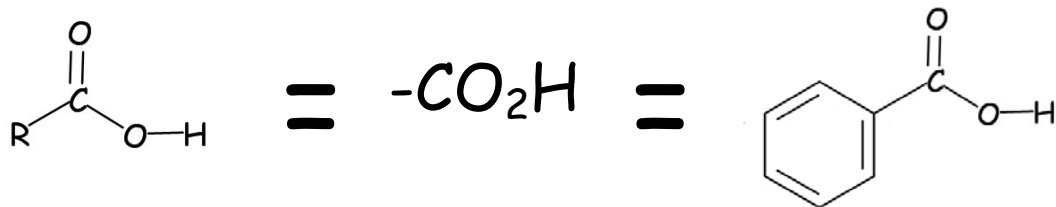
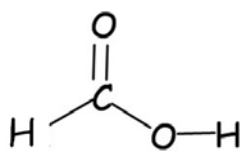


Carboxylic Acid

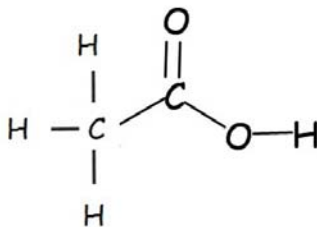


-carboxylic acids contain a hydroxyl group bonded to a carbonyl group

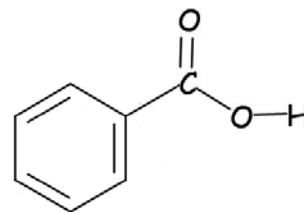
ex.



formic acid



acetic acid
(vinegar)

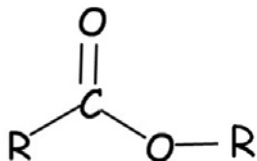


benzoic acid

Ester

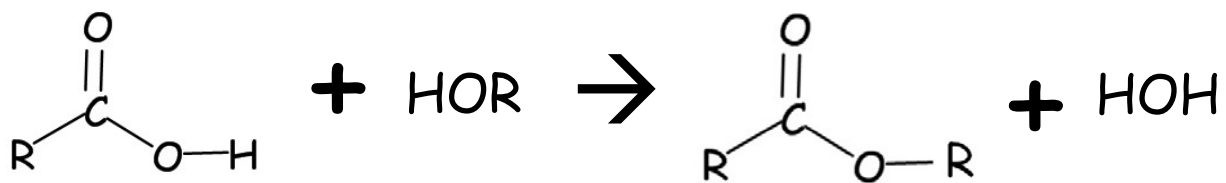
-the "H" of a carboxylic acid is substituted with an alkyl or aryl group

-distinct odors and tastes



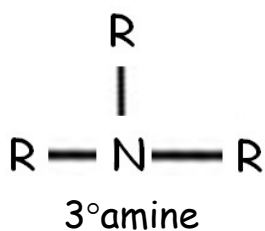
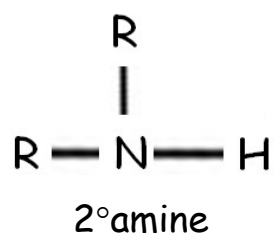
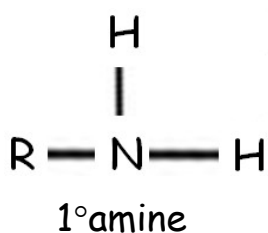
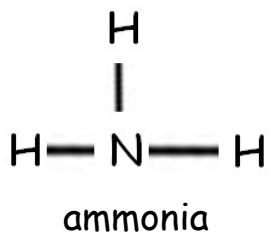
Rs can be either alkyl or aryl groups or one of each

-carboxylic acid reacts with alcohols to form esters and water

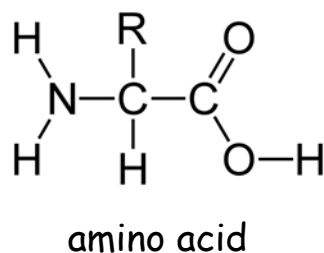
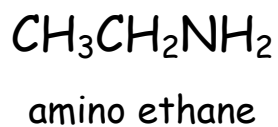


Amines

-one, two, or three of the Hs in ammonia (NH₃) are substituted by alkyl or aryl groups (N = nitrogen)

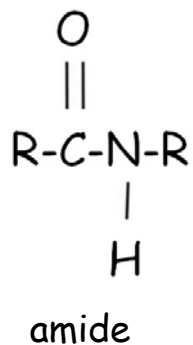


ex:

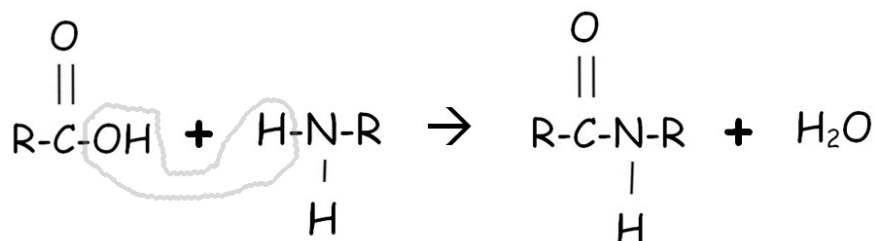


Amides

-similar to an ester but an N atom replaces the O atom in the chain



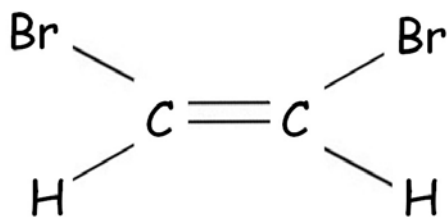
-a carboxylic acid reacts with amines to form amides and water



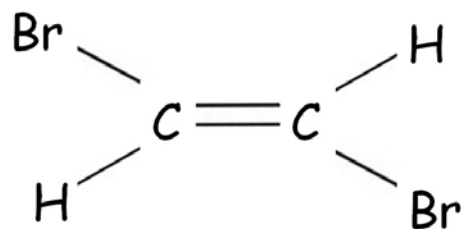
Geometric Isomers (cis and trans)

-the double bond is very rigid and does not allow movement (no rotation around axis of double bond) so atoms can bond to carbons of carbon-carbon double bond in cis or trans configuration

ex:



cis-1,2-dibromoethene



trans-1,2-dibromoethene