

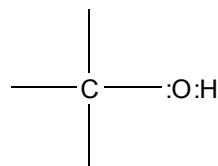
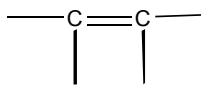
What is a Functional Group?

A functional group is a portion of a molecule that is a recognizable/classified group of bound atoms. In organic chemistry it is very common to see molecules comprised mainly of a carbon backbone with functional groups attached to the chain. The functional group gives the molecule its properties, regardless of what molecule contains it*; they are centers of chemical reactivity. The functional groups within a molecule need to be identified when naming.

*Definition taken from *Lecture Supplement*, First Edition by Steven Hardinger, Copyright 2008 by Steven Hardinger, Hayden-McNeil Publishing, Inc.

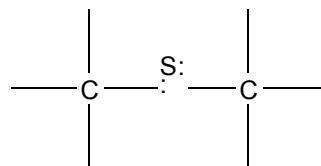
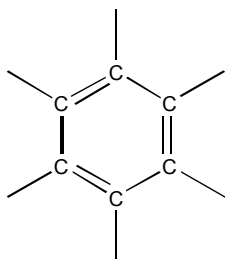
The figures were computer drawn using ChemBioDraw Ultra, Copyright 1986-2007 by Cambridge Soft.

Alkene: defined by the C-C double bond



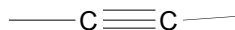
Sulfide: carbon groups bounded to a sulfur atom

Benzene Ring: a special ring of carbons with alternating single and double bonds, has a special degree of stability

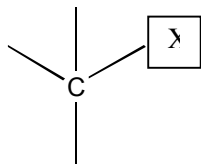


Alkyne: defined by the C-C triple bond

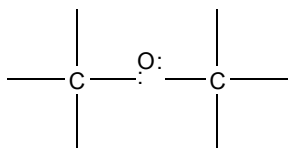
Alcohol: characterized by the hydroxy, -OH group. It is a very important group in monosaccharides (carbohydrates).



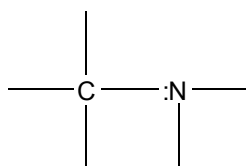
Alkyl Halide: haloalkane, replace X in the drawing with a halogen from the periodic table; when drawing a haloalkane be sure to not forget the lone pairs on X (there are three below)



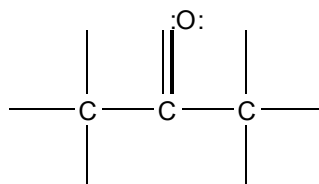
Ether: defined by an oxygen bounded to two carbons. The functional group of ethers can conform to many different functions, making it an important character in synthetic transformations (see page 67 in *Organic Chemistry: Structure and Function* by Vollhardt and Schore)



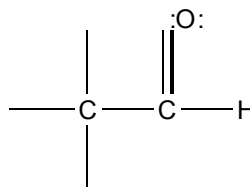
Amine: a carbon molecule bound to a nitrogen. The nitrogen typically has a lone pair of electrons.



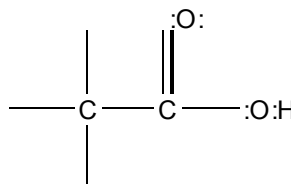
Ketone: defined by a carbon double bound to an oxygen (different than an aldehyde because it can only be found in the inside of a molecular chain- the carbon does not have to be attached to a hydrogen). Ketones, aldehydes, and carboxylic acids contain the carbonyl functional group: C double bound to O.



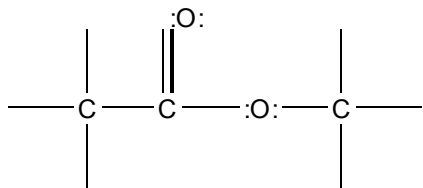
Aldehyde: defined by a carbon double bound to an oxygen and single bound to a hydrogen; because it is characterized by a bond to hydrogen, it can only be found at the ends of molecular chains



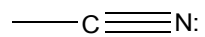
Carboxylic Acid: characterized by the carboxyl group; RCO₂H (R being any subset of a molecule); any molecular chain bound to a carbon, this carbon has a double bond to oxygen and also attached to an alcohol group



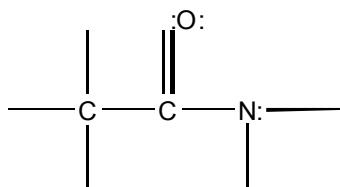
Ester: RCO₂R (R being any subset of a molecule)



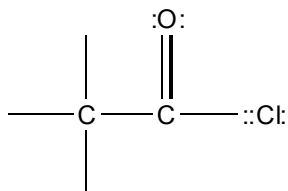
Nitrile:



Amide: contains the double bond between a carbon and an oxygen, the carbon is also bonded to a nitrogen



Acid Chlorine:



Imine:

