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.


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**Alkene**: defined by the C-C double bond

![Alkene structure](image)

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

![Benzene Ring structure](image)

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

![Alcohol structure](image)

**Sulfide**: carbon groups bounded to a sulfur atom

![Sulfide structure](image)

**Alkyne**: defined by the C-C triple bond

![Alkyne structure](image)
**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)

**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

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

**Ester:** RCO2R (R being any subset of a molecule)
Amide: contains the double bond between a carbon and an oxygen, the carbon is also bonded to a nitrogen

Acid Chlorine:

Imine: