Nomenclature Rules

1. Find the ***longest chain*** containing the ***highest priority functional group*** to give the parent compound.

2. Number the chain so that the functional group or substituent group has the ***lowest possible number***.

3. If there is more than one choice for numbering, select the choice that gives the largest number of branches; otherwise use the smallest number at the first point of difference.

4. Order the substituents alphabetically.

5. Give each substituent a number corresponding to its location.

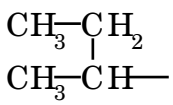
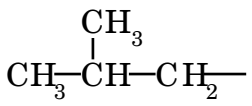
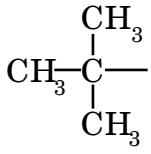
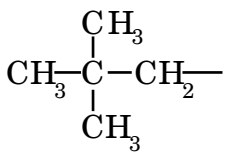
6. If more than one of a given substituent is present, use di-, tri-, tetra-, penta-, etc. to indicate the number of substituents present. (The prefix does not alter the alphabetic listing of the substituents.)

7. Use the appropriate suffix to indicate the highest priority functional group.

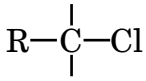
Functional Group Nomenclature (in order of priority)

Functional Group	**Group Prefix**	**Suffix**
Carboxylic Acid		-oic Acid
Ester		-oate (or Ester)
Acid Chloride		-oyl Chloride
Amide		-amide
Aldehyde	Oxo-	-al (or –aldehyde)
Nitrile	Cyano-	Nitrile
Ketone	Oxo-	-one
Alcohol	Hydroxy-	-ol
Amine	Amino-	-amine
Ether	Alkoxy- (*e.g.*, Ethoxy-)	
Halogen	Fluoro- Chloro- Bromo- Iodo-	
Nitro-	Nitro-	

Alkyl Group Nomenclature

Parent Compound	Prefix	Group	Structure
Methane	Meth-	Methyl	CH_3-
Methane	(Methylene)	Methylenyl	$-CH_2-$
Ethane	Eth-	Ethyl	CH_3CH_2-
Propane	Prop-	Propyl	$CH_3CH_2CH_2-$
Ethane	Isoprop-	Isopropyl	$(CH_3)_2CH-$
Butane	But-	Butyl	$CH_3(CH_2)_2CH_2-$
Propane	*Sec*-but-	*Sec*-butyl	
Propane	Isobut-	Isobutyl	
Ethane	*Tert*-but-	*Tert*-butyl	
Pentane	Pent-	Pentyl	$CH_3(CH_2)_3CH_2-$
Propane	*Neo*-pent-	*Neo*-pentyl	
Hexane	Hex-	Hexyl	$CH_3(CH_2)_4CH_2-$
Heptane	Hept-	Heptyl	$CH_3(CH_2)_5CH_2-$
Octane	Oct-	Octyl	$CH_3(CH_2)_6CH_2-$
Nonane	Non-	Nonyl	$CH_3(CH_2)_7CH_2-$
Decane	Dec-	Decyl	$CH_3(CH_2)_8CH_2-$
Undecane	Undec-	Undecyl	C-11
Dodecane	Dodec-	Dodecyl	C-12
Tridecane	Tridec-	Tridecyl	C-13
Tetradecane	Tetradec-	Tetradecyl	C-14
Pentadecane	Pentadec-	Pentadecyl	C-15
Hexadecane	Hexadec-	Hexadecyl	C-16
Heptadecane	Heptadec-	Heptadecyl	C-17
Octadecane	Octadec-	Octadecyl	C-18
Nonadecane	Nonadec-	Nonadecyl	C-19
Eicosane	Eicos-	Eicosyl	C-20

Oxidation States of Carbon

Structure	Oxidation state
	+4
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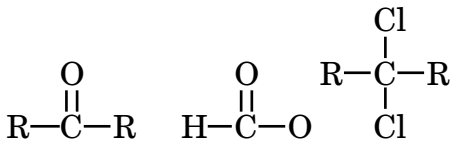
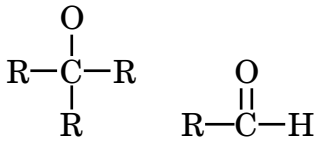
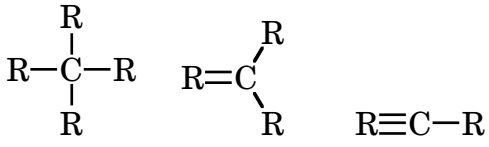
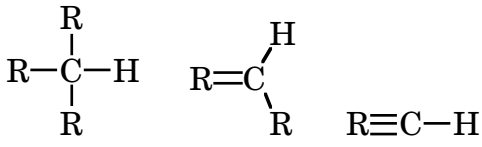
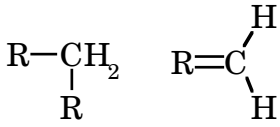
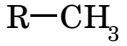
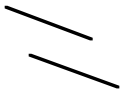
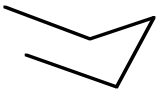
	+2
	+1
	0
	–1
	–2
	–3
	–4

Drawing a Cyclohexane Chair

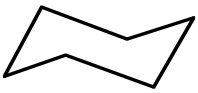
1. Draw two parallel lines, slanting downward, representing the "seat" of the chair with the four carbons that are in the same plane.



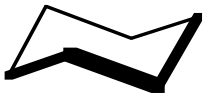
2. Add the "head" of the chair:



3. Add the "foot" of the chair. Note that the chair is comprised of three sets of parallel lines, with each line being parallel to the line two lines removed.



4. In thinking about the chair, remember that the representation is of a three-dimensional object, with the thickest lines in the drawing below being closest to you.



5. When adding substituents, the bonds for equatorial groups are parallel to the next line over in either direction. The bonds for axial groups are vertical lines pointing up or down.