

Summer Assignment
CAC IB HL Chemistry 2017

1. **Review** Topics 1, 2, 3, 4, 5, 6, 7, 11.1, 11.2, 12, 14, 15, 16 & 17 and prepare for a comprehensive test at the beginning of the fall semester. The best review will be in your Neuss workbook. Consider working through the “odds” in both the multiple choice and short answer questions.
2. **Organic Chemistry Nomenclature** Use the information on p. 425 (attached) of your textbook to memorize the functional group structures and functional group names associated with the following classes of organic compounds:
 - Alkane (note: hydrocarbons with single C-C bonds only are alkanes)
 - Alkene
 - Alkyne
 - Alcohol
 - Ether
 - Aldehyde
 - Ketone
 - Carboxylic Acid
 - Halogenoalkane
 - Amine
 - Ester
 - Nitrile (typo on p. 425; it's not “a”)
 - Amide



**MAKE NOTECARDS TO
MEMORIZE!**

Homologous series/class name	Functional group	Functional group name	Example	General name	Name
alkane		alkyl	$\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	alkane	butane
alkene	C=C	alkenyl	$\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}=\text{C}-\text{C}-\text{C}-\text{H} \\ & & & \\ \text{H} & & \text{H} & \text{H} \end{array}$	alk-x-ene (or x-alkene)	but-1-ene (or 1-butene)
alkynes	C≡C	alkynyl	$\begin{array}{cccc} & & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}\equiv\text{C}-\text{C}-\text{C}-\text{H} \\ & & & \\ & & \text{H} & \text{H} \end{array}$	alk-x-yne (or x-alkyne)	but-1-yne (or 1-butyne)
alcohol	-OH	hydroxyl	$\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{O} \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	alkan-x-ol (or x-alkanol)	propan-1-ol (or 1-propanol)
ether	$\text{C}-\text{O}-\text{C}$	ether	$\begin{array}{cccc} \text{H} & & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{C}-\text{H} \\ & & & \\ \text{H} & & \text{H} & \text{H} \end{array}$	alkoxyalkane	methoxyethane
aldehyde	$\begin{array}{c} \text{O} \\ \\ \text{C} \\ \\ \text{H} \end{array}$	carbonyl	$\begin{array}{ccc} \text{H} & \text{H} & \text{O} \\ & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & \\ \text{H} & \text{H} & \end{array}$	alkanal	propanal
ketone	$\begin{array}{c} \text{O} \\ \\ \text{C} \\ / \quad \backslash \\ \text{C} \quad \text{C} \end{array}$		$\begin{array}{ccccc} \text{H} & \text{O} & \text{H} & \text{H} & \text{H} \\ & & & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & & & \\ \text{H} & & \text{H} & \text{H} & \text{H} \end{array}$	alkan-x-one (or x-alkanone)	pentan-2-one (or 2-pentanone)
carboxylic acid	$\begin{array}{c} \text{O} \\ \\ \text{C} \\ / \quad \backslash \\ \text{O} \quad \text{H} \end{array}$	carboxyl	$\begin{array}{ccc} \text{H} & \text{H} & \text{O} \\ & & \\ \text{H}-\text{C}-\text{C}-\text{C} \\ & & \backslash \\ \text{H} & \text{H} & \text{O}-\text{H} \end{array}$	alkanoic acid	propanoic acid
halogenoalkane	-X X=Cl/Br/I	halo (chloro, bromo, iodo)	$\begin{array}{cccc} \text{H} & \text{Br} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	x-haloalkane	2-bromobutane
amine	-NH ₂ -NHR -NR ₂	amino	$\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{N} \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	alkylamine or x-aminoalkane or alkan-x-amine (or x-alkanamine)	propylamine or 1-aminopropane or propan-1-amine (or 1-propanamine)
ester	$\begin{array}{c} \text{O} \\ \\ \text{C} \\ / \quad \backslash \\ \text{O} \quad \text{C} \\ \quad \\ \text{C} \quad \text{C} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	ester	$\begin{array}{ccc} \text{H} & \text{O} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & & \\ \text{H} & & \text{H} & \text{H} \end{array}$	alkyl alkanoate	methyl propanoate
a	-C≡N	nitrile	$\begin{array}{ccc} \text{H} & \text{H} & \\ & & \\ \text{H}-\text{C}-\text{C}-\text{C}\equiv\text{N} \\ & & \\ \text{H} & \text{H} & \end{array}$	alkanenitrile (C of C≡N included in chain)	propanenitrile
amide	$\begin{array}{c} \text{O} \\ \\ \text{C} \\ \\ \text{NH}_2 \end{array}$	carboxamide	$\begin{array}{ccc} \text{H} & \text{H} & \text{O} \\ & & \\ \text{H}-\text{C}-\text{C}-\text{C} \\ & & \backslash \\ \text{H} & \text{H} & \text{NH}_2 \end{array}$	alkanamide	propanamide

Table 10.2 Functional groups that you are likely to meet. 'R' can be used to represent an alkyl group – so a general carboxylic acid may be represented as 'RCOOH' and an aldehyde as 'RCHO'. 'R' is occasionally also used to represent a phenyl group (–C₆H₅).