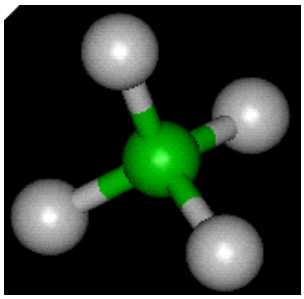
CHEMISTRY OF CARBON

Revised 9 Sept 2016
Stine, p. 92-97, Campbell 5th 48-55, Campbell's 6th: pp 52-59, 7th 58-66, Sadava pp 38-66, Campbell 10th 56-65

methane:



[TAKE MODEL SET TO SHOW STRUCTURES.]
Organic chemistry is the chemistry of carbon-containing compounds
At number = 6, therefore a member of group IV with 4 electrons in outer shell.

Carbon, halfway between group I to group VII, thus forms primarily covalent bonds.
Diamond's strength is testimony to strength of covalent bond
Forms bonds with a wide variety of elements, including self (especially important).

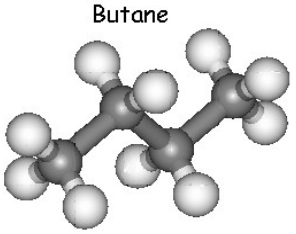
LEARN: CHNOPS are most commonly found elements in organisms (carbon: p 59)

HYDROCARBONS: (p 60) contain carbon backbone, fill up spots with H: called **alkanes. (C_nH_{2n+2})**

LEARN prefixes		**alkane description**	**boiling point:**
1	meth-	"swamp gas", flatulence gas (odorless...)	-162
2	eth-	natural gas, fruit ripener	-88
3	prop-	bottled gas, liquid at -42°C, solid 188°C	-42
4	but-	pocket lighters	0
5	pent-	first HC to be liquid at RT, bp = 36°C	36
6	hex-	"petroleum ether"	69
7	hept-		98
8	oct-	standard for gasoline (6-10°C)	126
9	non-		151
10	dec-		174

Butane

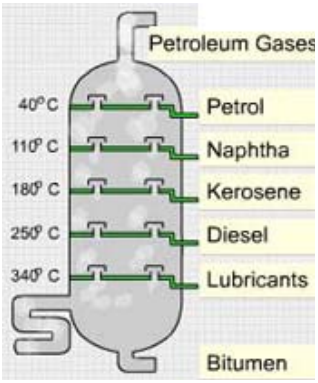
butane:



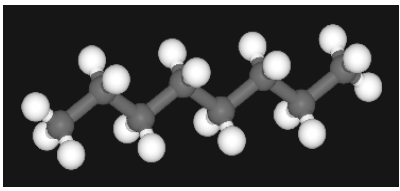
octane:

petroleum ["stone oil"]: fossilized remains of organisms:

gasoline	C_6- C_{10}	bp=40-205°C
kerosine:	C_{13}- C_{20} (175-325 C)	
asphalt is residue	$>C_{20}$	



LEARN: use suffix -yl to mean radical derivative
isomers: [same unit]: identical components, arranged differently.

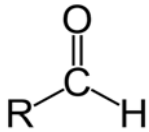


FUNCTIONAL GROUPS form with other elements: (p. 63)

OXYGEN: ("acid former") group 6, *forms 2 bonds*

NOTE: O always has **two pairs of unshared electrons**, will always form H bonds

aldehyde:

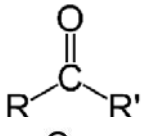


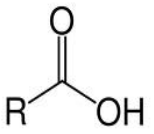
***LEARN* THESE:**

1)	**alcohol**	R-OH	-ol	(all polar):	methanol, ethanol (or ethyl alcohol), propanol, ethylene glycol
2)	**carbonyl:**				
	aldehyde	R-CHO	-al	formaldehyde	HCHO
	ketone	R–CO-R	-one	acetone	$CH_3CO\text{-}CH_3$
3)	**carboxylic acid**	R-COOH	-oic	acetic acid	CH_3COOH (-ate = ionized)
4)	**ether**	R-O-R	-oxy-	diethyl ether	$CH_3CH_2OCH_2CH_3$ (ethyloxyethane)
5)	**amines**	$R\text{-}NH_2$	-ine	**nitrogen**	group 5, forms 3 bonds
6)	**sulfhydryl**	R-SH	-thiol	**sulfur**	group 6, forms 2 bonds

ketone:

carboxylic acid:





amine: