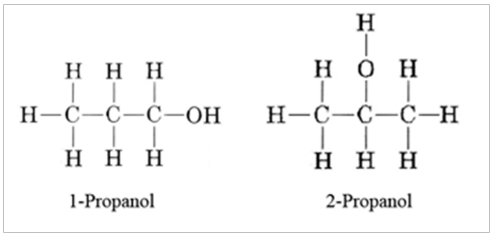
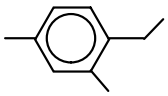
7.4 – Functional Groups



1. Review!

A.

What is the name and chemical formula of this molecule?

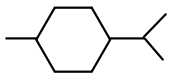


1-ethyl-2,4-dimethylbenzene

$C_{10}H_{14}$

B.

What is the name and chemical formula of this molecule?



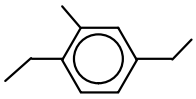
1-isopropyl-4-methylcyclohexane

$C_{10}H_{20}$

2. Review!

A.

What is wrong with the name of this molecule?

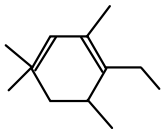


1,4-diethyl-3-methylbenzene

It is misnumbered. It should be 1,4-diethyl-2-methylbenzene

B.

What is wrong with this picture?



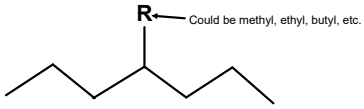
One carbon in the ring has five bonds - impossible!

Functional Groups

Def: An atom or group of atoms thatreacts predictably.

We will study halogens, and two oxygen groups.

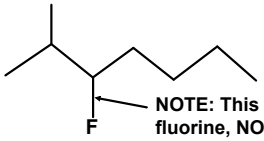
Note: **R** denotes any carbon group in a structure (R = random).



Halogens (See Resources 2)

F, Cl, Br, and I are substituents; prefixes: fluoro-, chloro-, bromo-, and iodo-; standard rules apply (number carbons, alphabetize, prefixes).

Guided Example 3 A:
Name this, and write the formula:

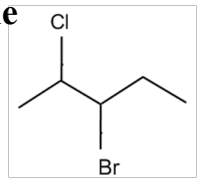


NOTE: This line is a bond to fluorine, NOT a methyl group.

3-fluoro-2-methylheptane $C_8H_{17}F$

3 B. Guided Example

Name and write the formula:



Parent chain: 5 carbon: *pentane*.

bromo- on 3rd, *chloro-* on 2nd.

3-bromo-2-chloropentane $C_5H_{10}BrCl$

Chem Unit 7.4 Notes - Functional Groups

Oxygen Groups

This chart is in your Resources Page 2.

Compound Type:	Alcohol	Ether
General Structural Formula		
Functional Group	Hydroxyl	Ether
Line Structure Appearance		

What was the OH^- ion called?

Hydroxide!

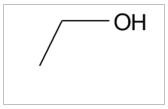
Alcohols

Hydroxyl group makes a chemical an alcohol.

—OH

Naming: number carbons; add *–ol* ending to parent chain.

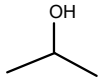
Example 4 A: Draw 1-ethanol.
Ethane – 2 carbon chain - single bonds.



What is the formula?
C_2H_5OH or C_2H_6O

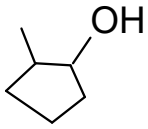
More Alcohol Examples

4 B. Draw and formula 2-propanol (isopropyl alcohol).



Formula = C_3H_7OH or C_3H_8O

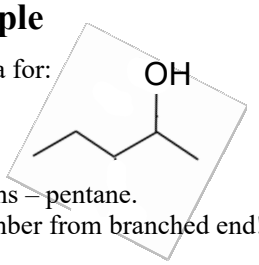
4 C. Draw and formula 1-methyl-2-cyclopentanol.



Formula = $C_6H_{12}O$ or $C_6H_{11}OH$

4 D. Example

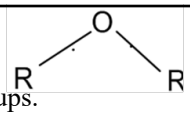
Name, and write the formula for:



5 singly bonded carbon atoms – pentane.
Hydroxyl group on 2nd. Number from branched end!
2-pentanol.

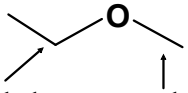
Formula: $C_5H_{12}O$ or $C_5H_{11}OH$

Ethers



Oxygen bridges two carbon(R) groups.
1. List each R group (with *-yl ending*) separately (alphabetize).
2. End with word *ether*.

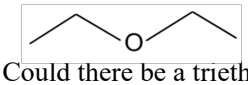
Example 5. Name and write the formula for:



Ethyl group; methyl group→ ethyl methyl ether.
Formula = C_3H_8O

6. Example

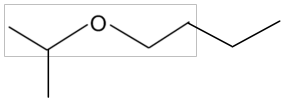
A. Draw and formula diethyl ether.



Formula = $C_4H_{10}O$

Could there be a triethyl ether?
No! Oxygen can only have two bonds.

B. Name and formula this:



butyl isopropyl ether.
Formula = $C_7H_{16}O$

Homework

7.4 Booklet Problems.
Due next class.
Prepare for lab next class period!