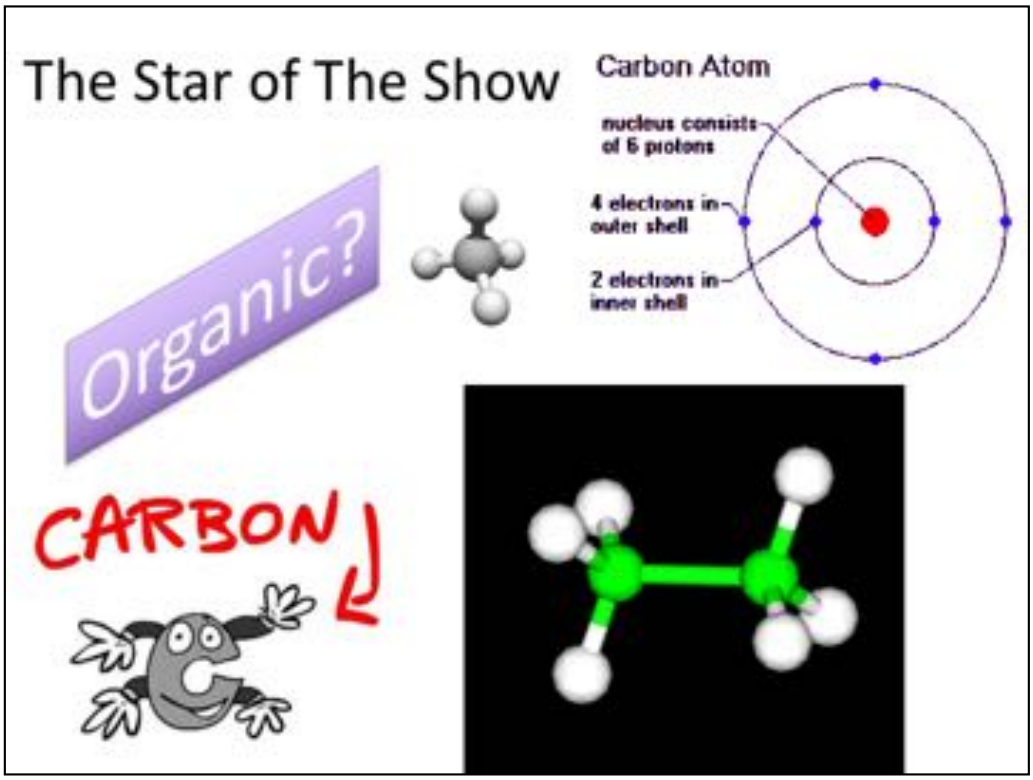
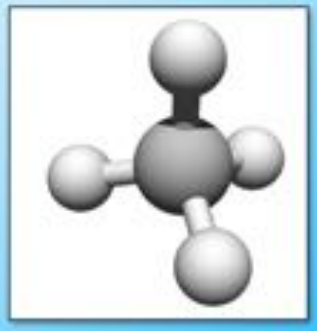
The Star of The Show



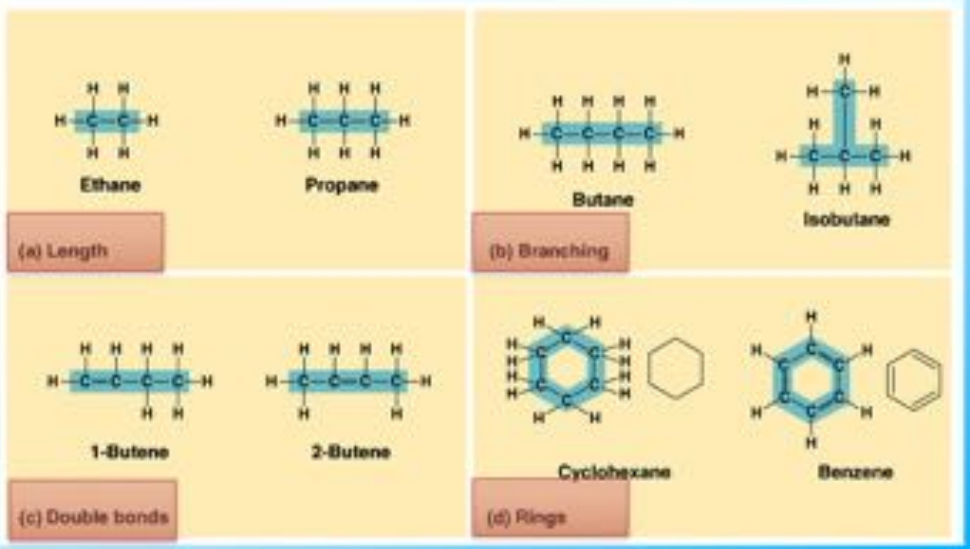
Building with Carbon: Hydrocarbons

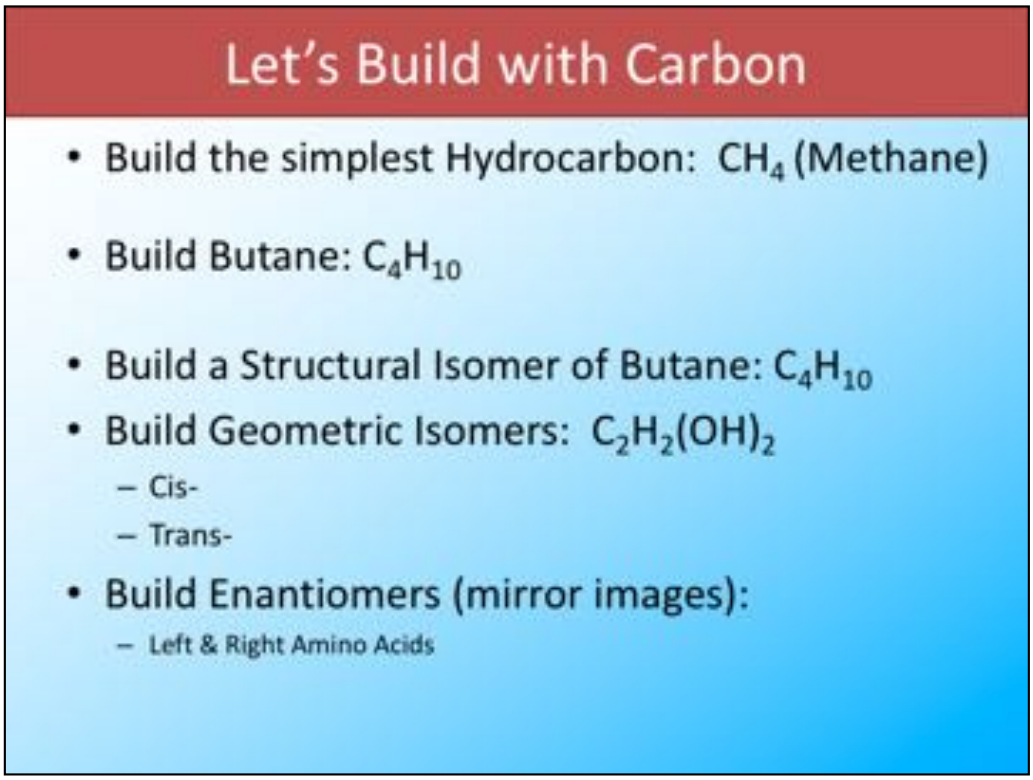
- non-polar
  - not soluble in H_2O
  - Hydrophobic



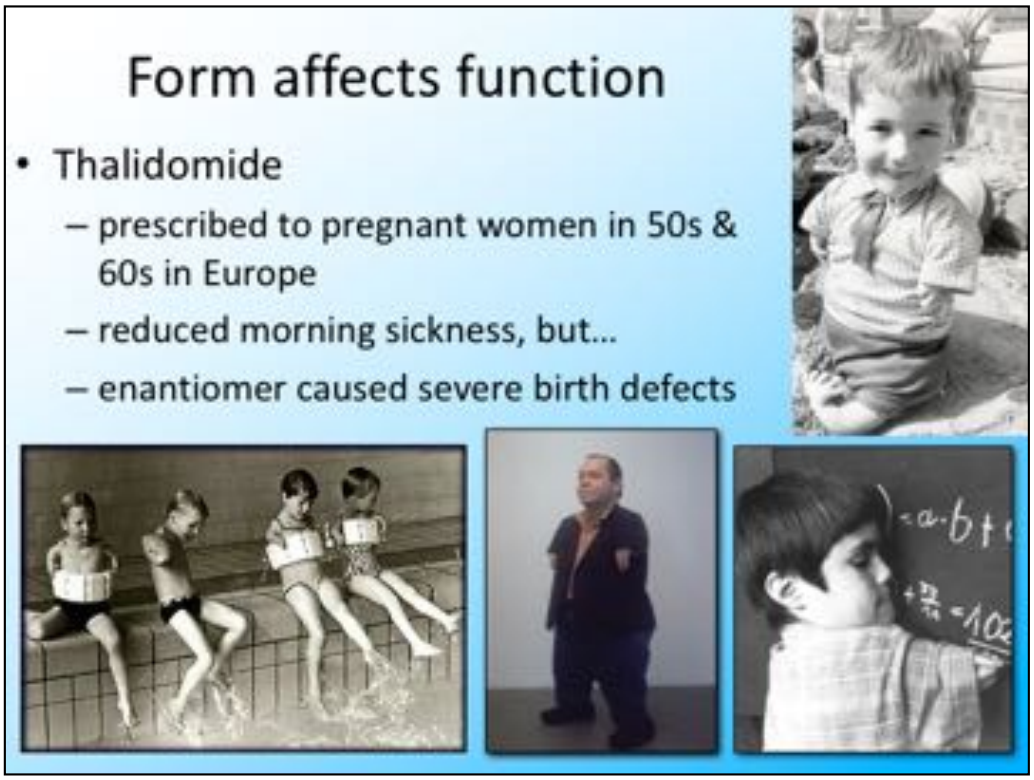
methane
(simplest HC)

Hydrocarbons can grow





Double bonds Build Ethen-1,2-diol (Cis/Trans)



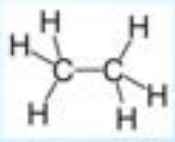
Today, thalidomide is sold by Celgene, mainly as a treatment of certain can

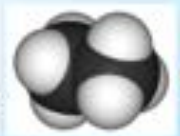
Thalidomide is racemeric – it switches easily between the mirror image forr

Laboratory tests after the thalidomide disaster showed that in some animals

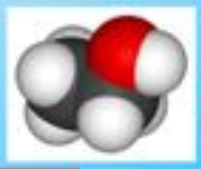
Diversity of molecules

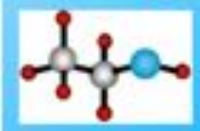
- Substitute other atoms or groups around the carbon





ethane (C_2H_6)





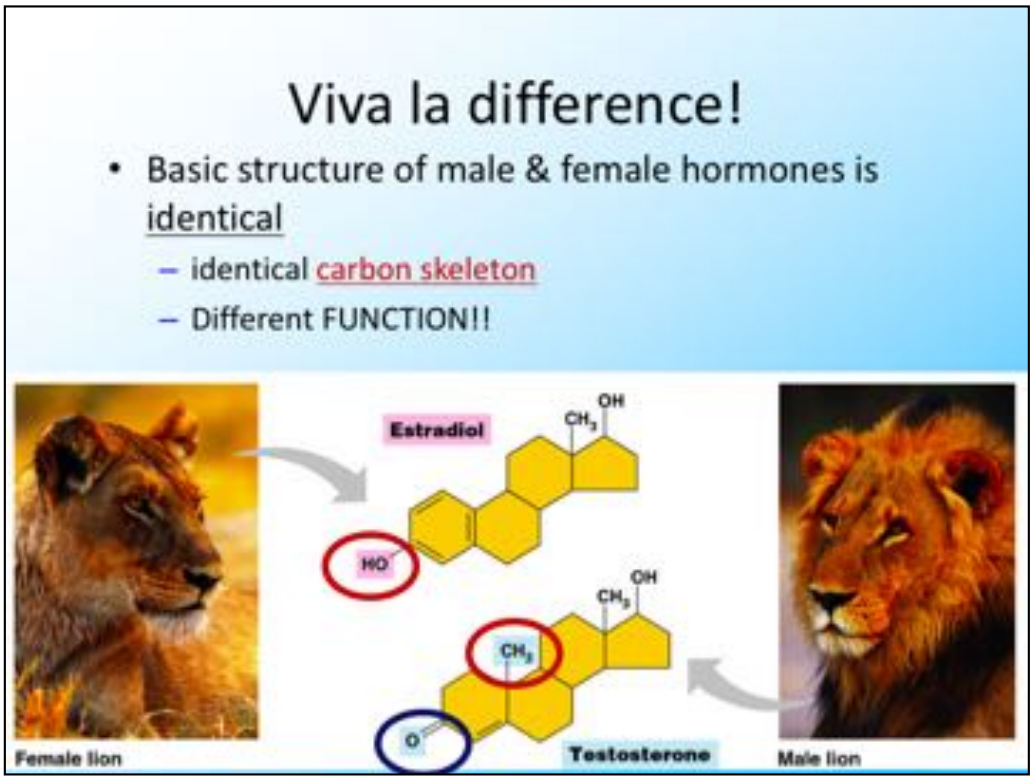
ethanol (C_2H_5OH)

Use Binder Page 57

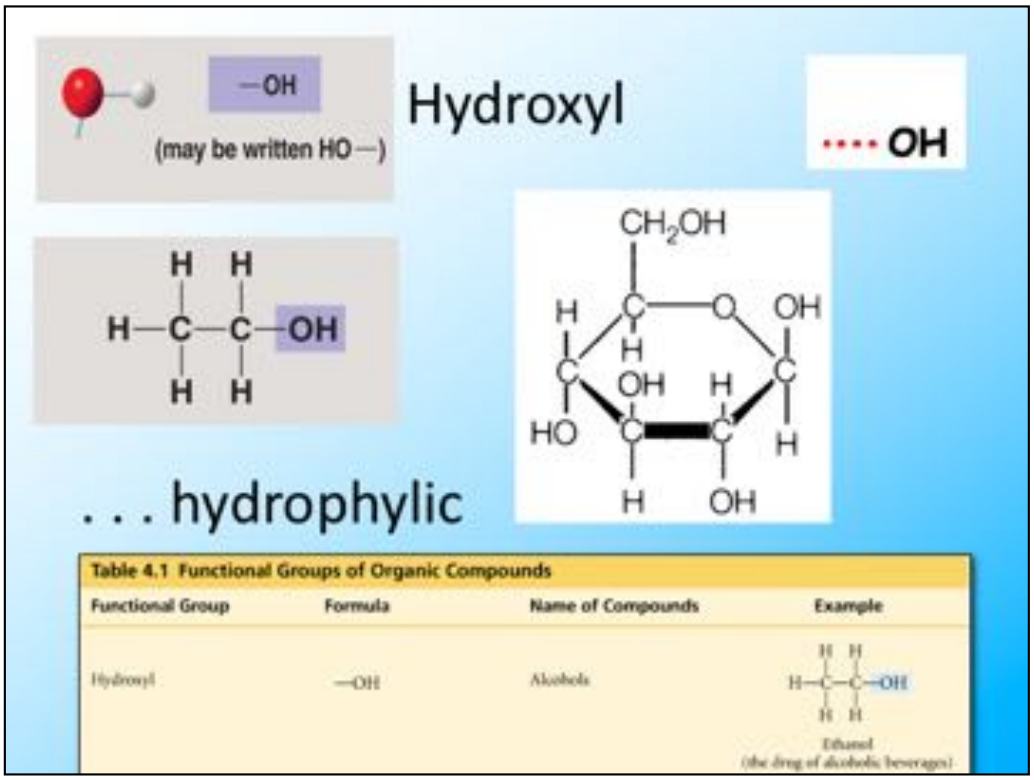
PLEASE,GO MASS YOUR PLANTS!!!

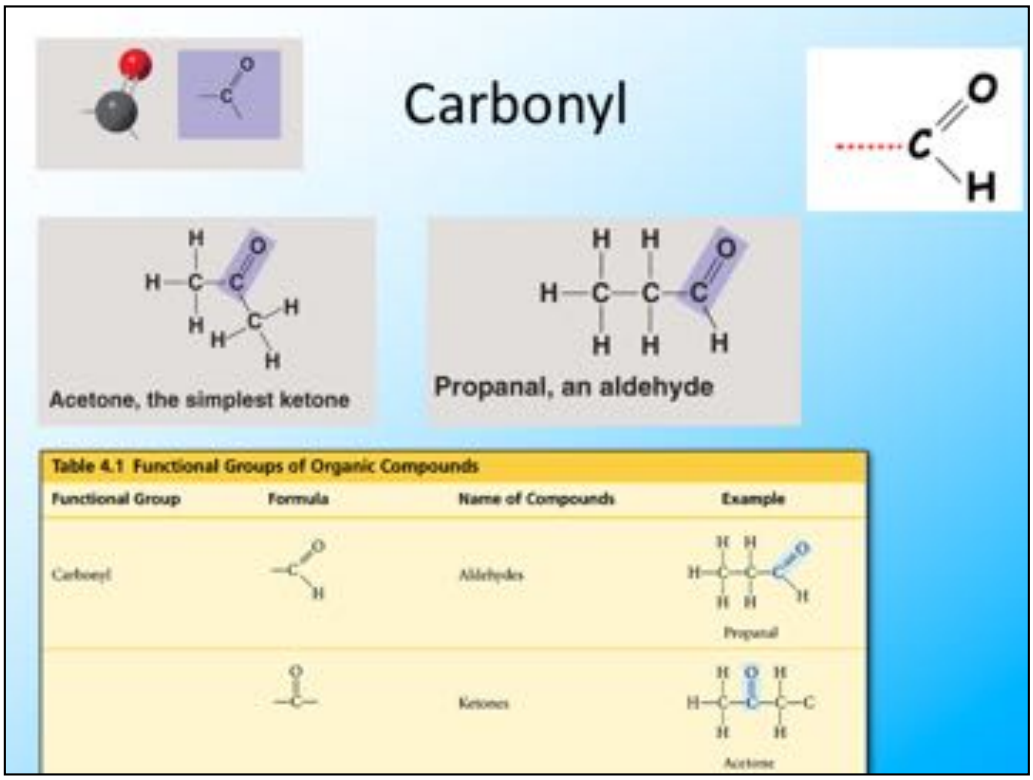
RECORD RESULTS!

GET OUT BINDER PAGE 57



For example the male and female hormones, testosterone and estradiol, differ from eac


—OH
(may be written HO—)
Hydroxyl
···· OH
H H
H—C—C—OH
H H
CH2OH
H
C
O
OH
H
C
OH
H
C
HO
C
H
H
OH
. . . hydrophilic
Table 4.1 Functional Groups of Organic Compounds
Functional Group
Formula
Name of Compounds
Example
Hydroxyl
—OH
Alcohols
Ethanol
(the drug of alcoholic beverages)


Carbonyl
Acetone, the simplest ketone
Propanal, an aldehyde
Table 4.1 Functional Groups of Organic Compounds
Functional Group
Formula
Name of Compounds
Example
Carbonyl
Aldehydes
Propanal
Ketones
Acetone

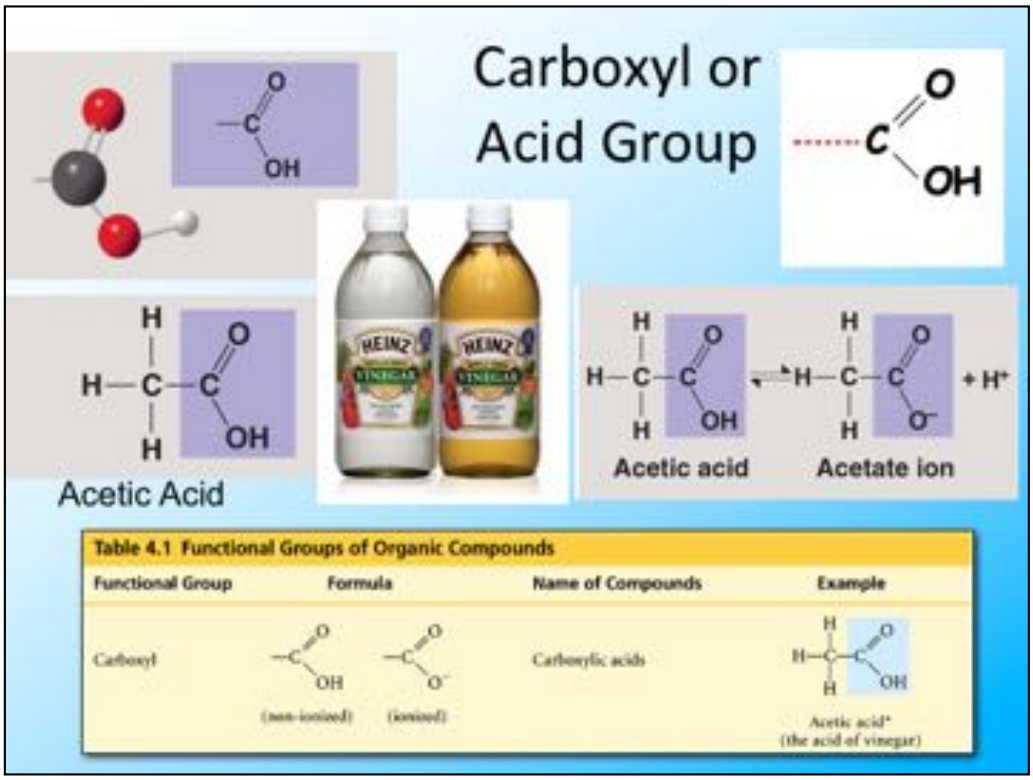


Table 4.1 Functional Groups of Organic Compounds

Functional Group	Formula	Name of Compounds	Example
Carboxyl	(non-ionized) (ionized)	Carboxylic acids	Acetic acid* (the acid of vinegar)

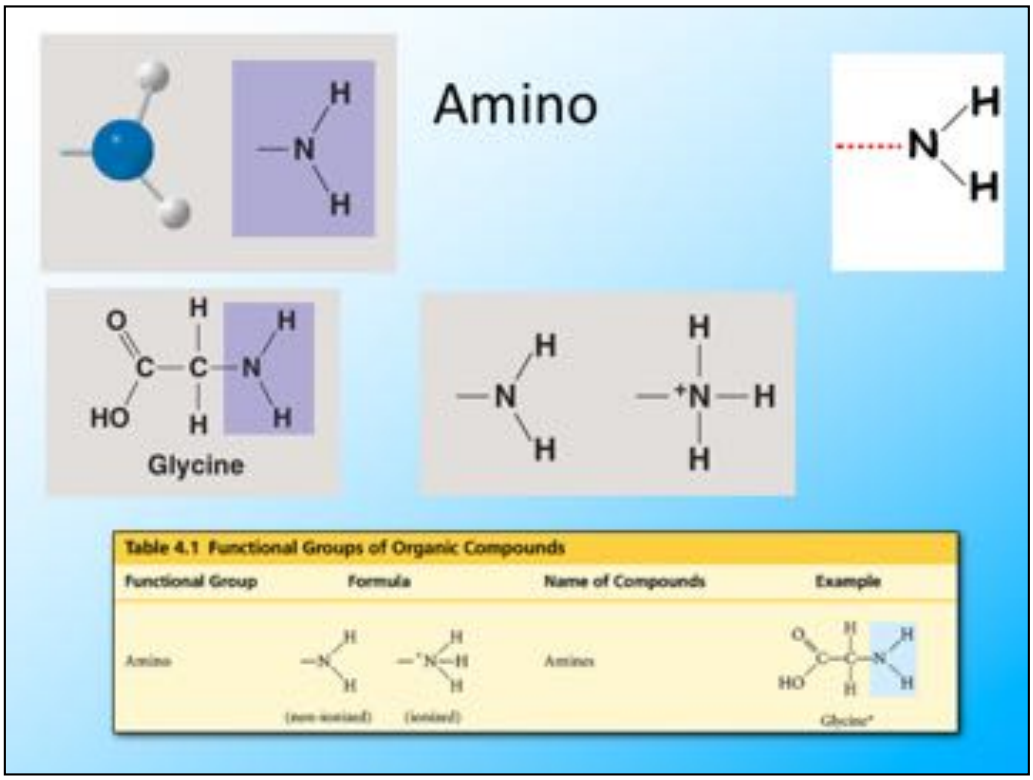


Table 4.1 Functional Groups of Organic Compounds

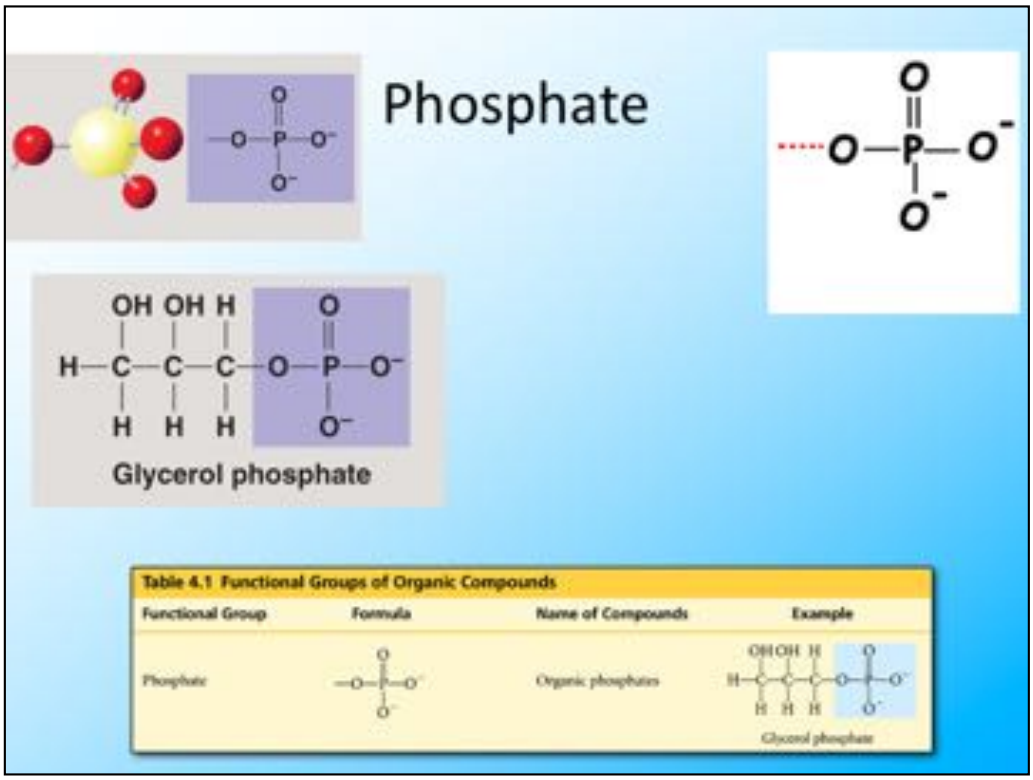
Functional Group	Formula	Name of Compounds	Example
Amino	(non-ionized) (ionized)	Amines	Glycine*

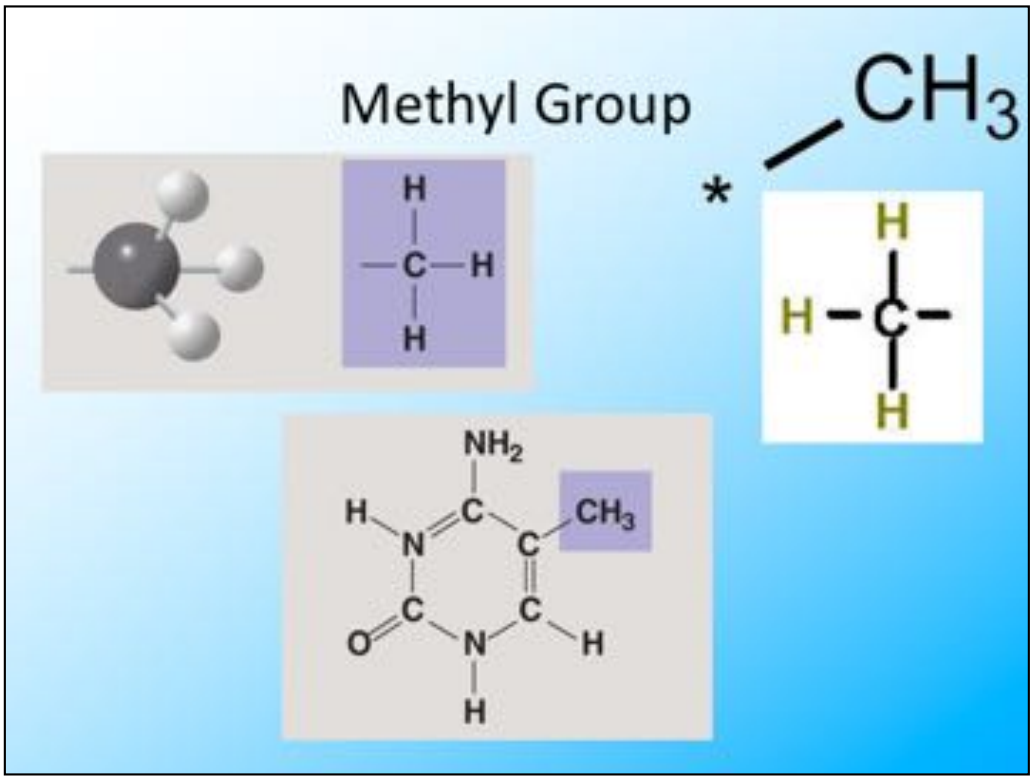
Sulfhydryl

----- SH

Table 4.1 Functional Groups of Organic Compounds

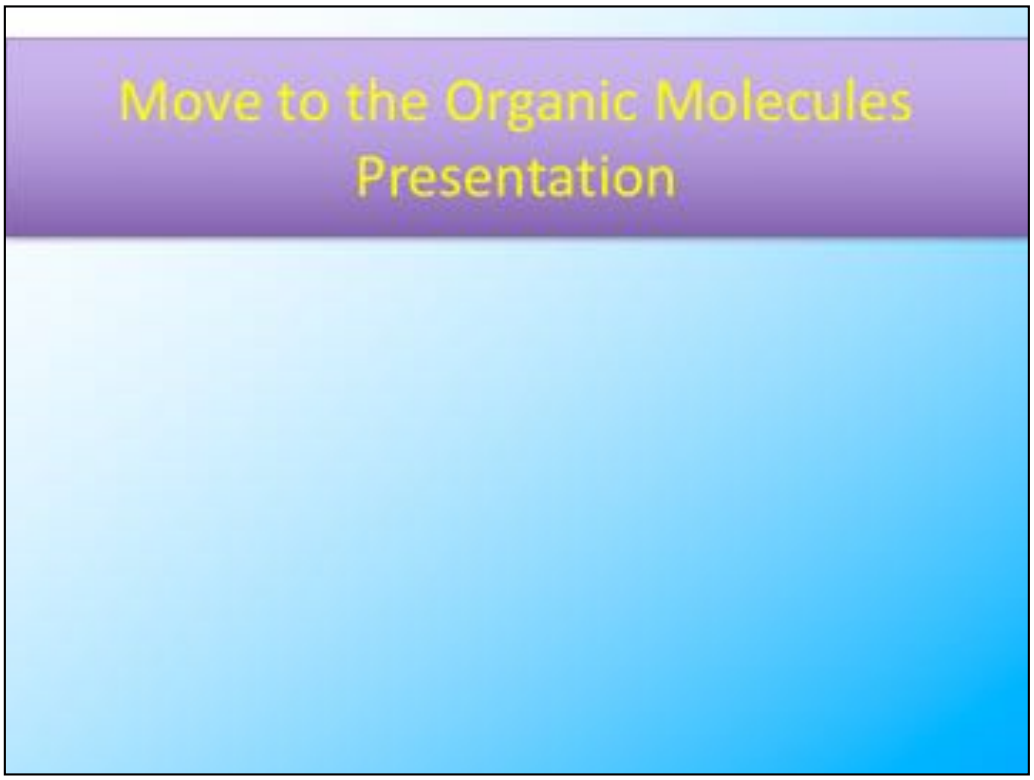
Functional Group	Formula	Name of Compounds	Example
Sulfhydryl	—SH	Thiols	 Ethanethiol


Phosphate
Glycerol phosphate
Table 4.1 Functional Groups of Organic Compounds
Functional Group
Formula
Name of Compounds
Example
Phosphate
Organic phosphates
Glycerol phosphate



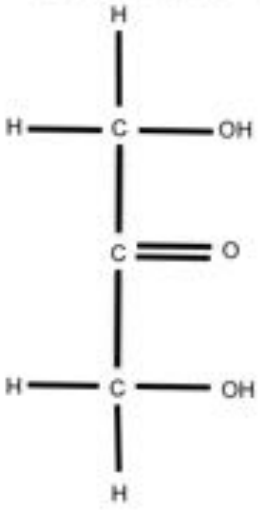
Add to DNA to affect gene expression

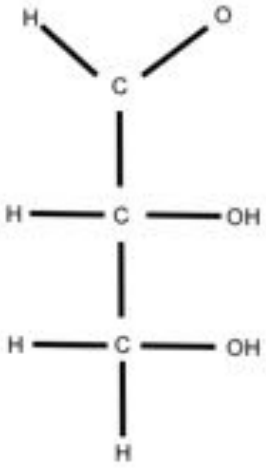
Add to Steroid Sex hormones change function


Move to the Organic Molecules Presentation

Review Questions

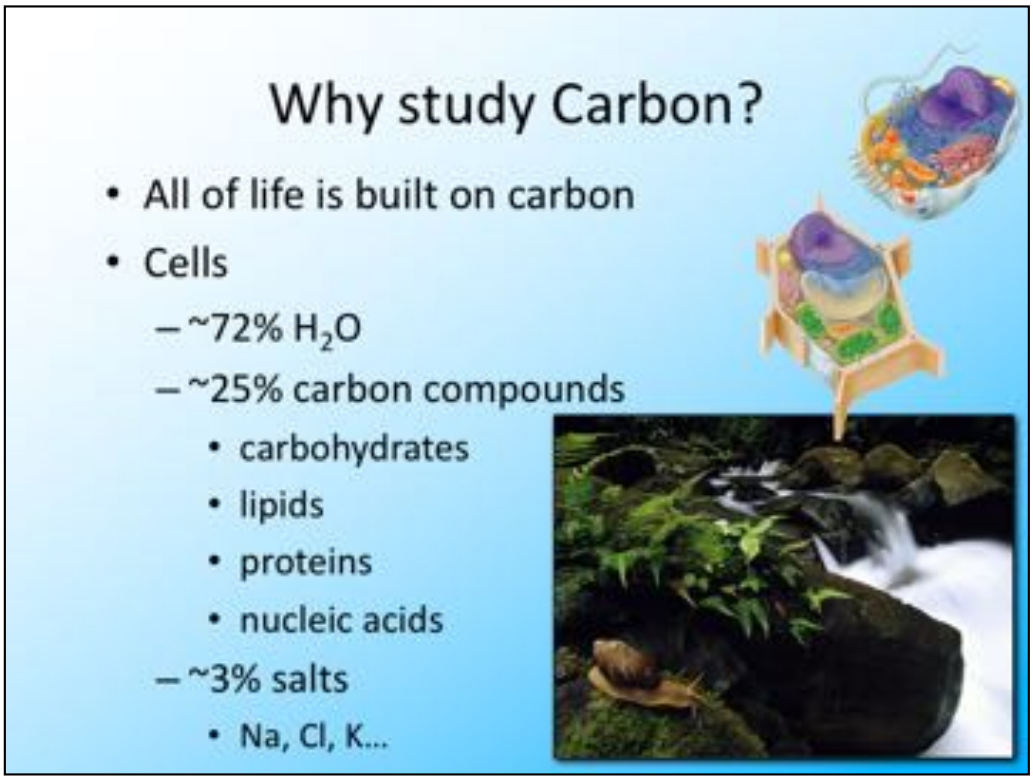
What are the Functional Groups?





A. R–OH	B. R=O
C. R-COOH	D. R-SH
E. R-PO_4 R-CH_3	F.

1. Produces OH ions in water
2. Placement determines whether the molecule is an aldehyde or a ketone
3. Contains the major high energy bond in biological molecules
4. Used in proteins to stabilize structure
5. Presence of this group classifies molecules as alcohols.



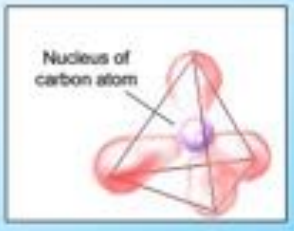
Why do we study carbon -- is it the most abundant element in living organis

H & O most abundant

C is the next most abundant

Chemistry of Life

- Organic chemistry is the study of carbon compounds
- C atoms are versatile building blocks
  - bonding properties
  - 4 stable covalent bonds

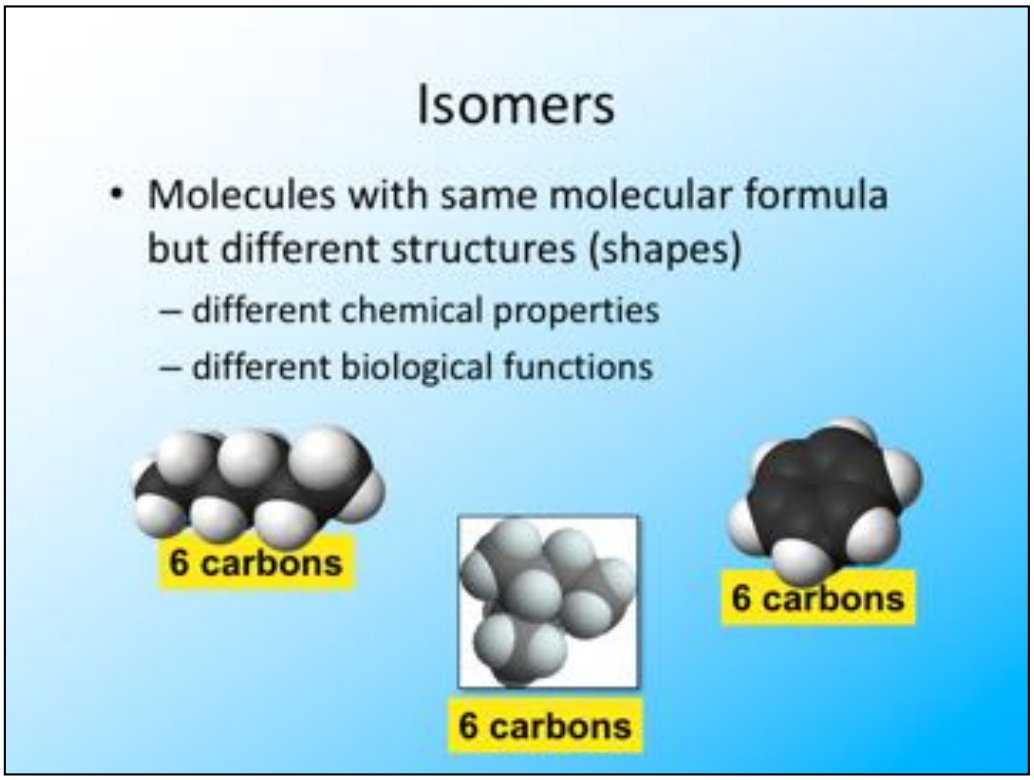


Carbon chemistry = organic chemistry

Why is it a foundational atom?

What makes it so important?

Can't be a good building block if you only form 1 or 2 bonds.

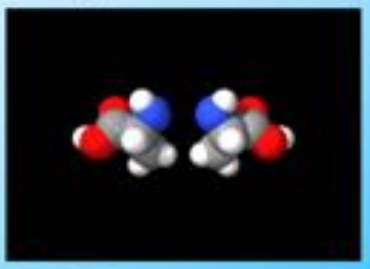


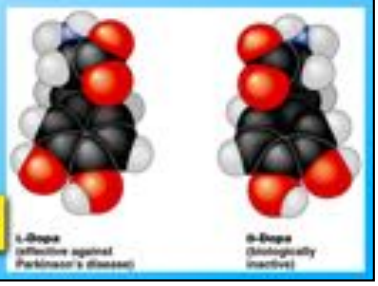
Same formula but different structurally & therefore different functionally. Mo

Ex. Isomers may be ineffective as medicines

Form affects function

- Structural differences create important functional significance
  - amino acid alanine
    - L-alanine used in proteins
    - but not D-alanine
  - medicines
    - L-version active
    - but not D-version
  - sometimes with tragic results…



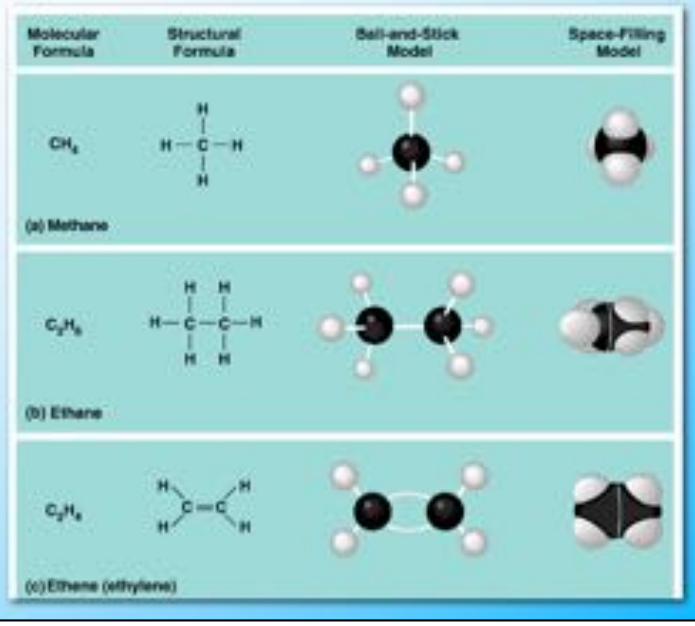


stereoisomers

Functional groups

- Parts of organic molecules that are involved in chemical reactions
  - give organic molecules distinctive properties
    - hydroxyl
    - amino
    - carbonyl
    - sulfhydryl
    - carboxyl
    - phosphate
- Affect reactivity
  - makes hydrocarbons hydrophilic
  - increase solubility in water

Complex molecules assembled like TinkerToys



Like sugars: $C_6H_{12}O_6$

But can be arranged in different ways

-glucose

-galactose

-dextrose

Writing AP Bio Essays

- First One: #129:

The unique properties (characteristics) of water make life possible on Earth. Select three properties of water and:

a. For each property, identify and define and explain it in terms of the physical/chemical nature of water.

b. For each property, describe one example of how the property affects the functioning of living organisms.