
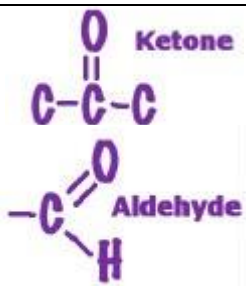
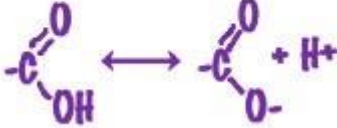
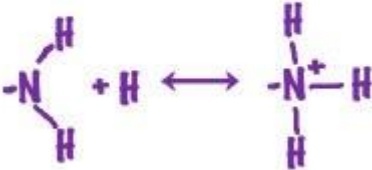
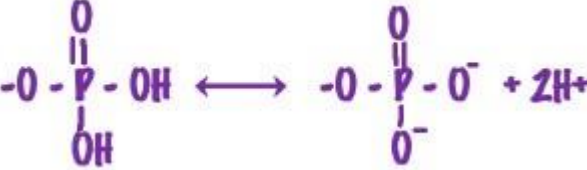
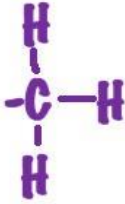


ORGANIC CHEMISTRY BASICS

PROPERTIES OF CARBON:

- Has 4 valence electrons
- Form 4 covalent bonds (single, double, triple)
- Carbon chain
 - Straight, branching, ring
 - Varies in length, number and location of double bonds, and presence of other elements
- Forms isomers
C₆H₁₂O₆ chemical formula for glucose, fructose, & galactose

FUNCTIONAL GROUP	DRAWING/FORMULA	PROPERTIES
Hydroxyl		<ul style="list-style-type: none">• Polar• Water soluble Alcohols
Carbonyl		<ul style="list-style-type: none">• Polar• Water soluble

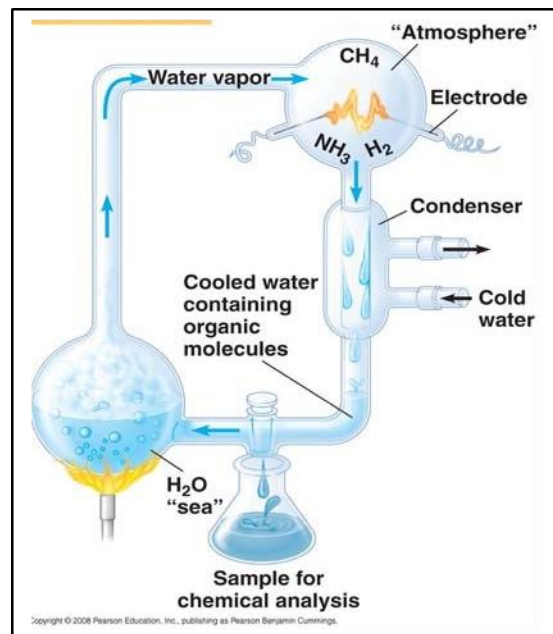
FUNCTIONAL GROUP	DRAWING/FORMULA	PROPERTIES
<p>Carboxyl</p>	<p style="text-align: center;">-COOH</p> 	<ul style="list-style-type: none"> • Polar • Water soluble • Acid
<p>Amino</p>	<p style="text-align: center;">-NH₂</p> 	<ul style="list-style-type: none"> • Polar • Water soluble • Weak base
<p>Sulphydral</p>	<p style="text-align: center;">-SH</p>	<ul style="list-style-type: none"> • Form disulfide bridges • Stabilize protein shape
<p>Phosphate</p>		<ul style="list-style-type: none"> • Polar • Water soluble • Acid • Important in energy transfer
<p>Methyl</p>	<p style="text-align: center;">-CH₃</p> 	<ul style="list-style-type: none"> • Nonpolar • Not water soluble

QUESTION: CIRCLE AND IDENTIFY THE FUNCTIONAL GROUP(S) FOUND IN EACH OF THE FOLLOWING MOLECULES.

<p style="text-align: center;">Molecule #1</p> $ \begin{array}{c} \text{H} & \text{H} & & \text{O} \\ & & & // \\ \text{H} & - \text{N} - & \text{C} - & \text{C} \\ & & & \backslash \\ & \text{H} & \text{R} & \text{O} - \text{H} \end{array} $	<p style="text-align: center;">Molecule #2</p> $ \begin{array}{c} \text{HO} & \text{O} & \text{OH} \\ & & \\ \text{H} - \text{C} - & \text{C} - & \text{C} - \text{H} \\ & & \\ \text{H} & & \text{H} \end{array} $
<p style="text-align: center;">Molecule #3</p> $ \begin{array}{c} \text{O} & \text{OH} & \text{OH} \\ & & \\ \text{C} - & \text{C} - & \text{C} - \text{H} \\ & & \\ \text{H} & \text{H} & \text{H} \end{array} $	<p style="text-align: center;">Molecule #4</p> $ \begin{array}{c} \text{H} & & \text{O} \\ & & // \\ \text{H}_2\text{N} - \text{C} - & \text{C} & \\ & & \backslash \\ \text{CH}_2 & & \text{OH} \\ \\ \text{SH} \end{array} $
<p>Molecule #5</p> $ \begin{array}{c} \text{CH}_2 - \overset{+}{\text{N}}(\text{CH}_3)_2 \\ \\ \text{CH}_2 \\ \\ \text{O} \\ \\ \text{O} = \text{P} - \text{O}^- \\ \\ \text{O} \\ \\ \text{CH}_2 - \text{CH} - \text{CH}_2 \\ \quad \\ \text{O} \quad \text{O} \\ \quad \\ \text{C} = \text{O} \quad \text{C} = \text{O} \\ \quad \\ (\text{CH}_2)_8 \quad (\text{CH}_2)_7 \\ \quad // \\ \text{CH}_3 \quad \text{CH} \\ \quad \quad \\ \quad \quad (\text{CH}_2)_7 \\ \quad \quad \quad \\ \quad \quad \quad \text{CH}_3 \end{array} $	

4.1

1. Study this figure of Stanley Miller's experiment to simulate conditions thought to have existed on the early Earth. Explain the elements of this experiment, using arrows to indicate what occurs in various parts of the apparatus.



2. What was collected in the sample for chemical analysis? What was concluded from the results of this experiment?

4.2

3. Make an electron distribution diagram of carbon. It is essential that you know the answers to these questions:
 - a. How many valence electrons does carbon have? _____
 - b. How many bonds can carbon form? _____
 - c. What type of bonds does it form with other elements? _____
4. Carbon chains form skeletons. List here the types of skeletons that can be formed.

5. What is a *hydrocarbon*? Name two. _____

A. Are hydrocarbons hydrophobic or hydrophilic? _____

6. In Chapter 2 you learned what an *isotope* is. Since students often confuse this word with *isomer*, please define each term here and give an example.

	Definition	Example
<i>isotope</i>		
<i>isomer</i>		

4.3

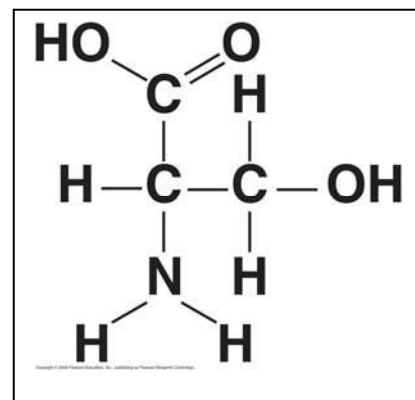
7. Define *functional group*.

8. There are seven functional groups. Complete the following chart.

	Hydroxyl	Carbonyl	Carboxyl	Amino	Sulfhydryl	Phosphate	Methyl
Structure							
Example							
Functional Properties							

9. You will need to master the chart above and the information in it. Using the functional groups above, see if you can answer the following prompts:

- a. -NH_2
- b. Can form cross-links that stabilize protein structure
- c. Key component of ATP
- d. Can affect gene expression
- e. CH_3
- f. Is always polar
- g. Determines the two groups of sugars
- h. Has acidic properties
- i. -COOH
- j. Acts as a base
- k. Circle and identify three functional groups in the molecule shown to right.



End of Chapter Synthesis and Evaluation

Do problems 1-4. Check your answers to 1-4 in back of text.

1. _____
2. _____
3. _____
4. _____

Study Guide/ISN (20 Points)

In your study guide book, review pages 37-38. In your ISN, do the following: Title the page: **Chapter 4 Carbon and the molecular diversity of life must knows!** In one color, copy down the must know item listed on page 37, In a different color underneath include in a different color a brief description, diagram model or mnemonic device that will help you study for the unit test and more importantly the AP test in May.

Bozeman/Podcasts/AP Biology ISN (see syllabus for format) (20 points each)

1. None ☺