

## Chapter 3 Molecules of Life

### Organic Compounds

- Organic compounds are molecules containing \_\_\_\_ and \_\_\_\_
- Small organic compounds have \_\_\_\_\_ or fewer carbon atoms (simple \_\_\_\_\_, amino acids, fatty acids, \_\_\_\_\_)
- Small organic compounds are used for \_\_\_\_\_ (respiration) or to build large molecules (\_\_\_\_\_)
- Functional groups give molecules distinct properties:

\_\_\_\_\_ – OH  
\_\_\_\_\_ – COOH  
\_\_\_\_\_ – NH<sub>2</sub>  
\_\_\_\_\_ – PO<sub>4</sub>

### Reactions

- Reactions only happen at a \_\_\_\_\_ rate in organisms with the help of \_\_\_\_\_ that speed up the reaction
- In a \_\_\_\_\_ reaction (also called dehydration synthesis) two smaller molecules are linked together by removing \_\_\_\_\_ and \_\_\_\_\_ from the reactants
- Hydrolysis (\_\_\_\_\_) occurs when a \_\_\_\_\_ molecule is added in order to \_\_\_\_\_ a large molecule apart

## Carbohydrates

- The simplest carbohydrates are \_\_\_\_\_  
("one-sugar")
- Ribose and \_\_\_\_\_ (5 carbons) are building blocks for RNA & \_\_\_\_\_
- \_\_\_\_\_ and fructose (6 carbons) are used for \_\_\_\_\_ or for building larger carbohydrates
  
- \_\_\_\_\_ carbohydrates are called oligosaccharides  
("\_\_\_\_\_")
- Disaccharides have only \_\_\_\_\_ sugar monomers and are very common
- \_\_\_\_\_ is used for sugar transport in \_\_\_\_\_
- Lactose is \_\_\_\_\_ sugar
- \_\_\_\_\_ is in germinating seeds
  
- Polysaccharides are straight or branched \_\_\_\_\_ of hundreds or \_\_\_\_\_ of sugar units
- \_\_\_\_\_ is used for plant energy \_\_\_\_\_
- \_\_\_\_\_ is animal energy storage
- Cellulose is plant \_\_\_\_\_
- \_\_\_\_\_ makes up arthropod exoskeletons and \_\_\_\_\_  
cell walls

## Lipids

- Lipids are greasy or \_\_\_\_\_ compounds that are \_\_\_\_\_
- They function in energy \_\_\_\_\_, membrane structure, and coatings
- Most lipids contain \_\_\_\_\_ acid molecules, which are like long, flexible \_\_\_\_\_
  
- \_\_\_\_\_ are commonly called fats and oils
- They are formed when a \_\_\_\_\_ molecule has 1, 2, or 3 fatty acids attached
- The resulting molecule is called a \_\_\_\_\_, di-, or \_\_\_\_\_
- \_\_\_\_\_ fats do not have any double or triple bonds in them
- Saturated fats are \_\_\_\_\_ at room temperature
- \_\_\_\_\_ fats have some double or triple bonds
- Unsaturated fats are \_\_\_\_\_ at room temperature
  
- Phospholipids have \_\_\_\_\_ fatty acid tails and a \_\_\_\_\_ phosphate head
- Phospholipids make up cell \_\_\_\_\_
  
- \_\_\_\_\_ have very long fatty acid tails attached to long chain \_\_\_\_\_ (instead of glycerol)
- The mixture of \_\_\_\_\_ molecules makes waxes very firm and water repellent
- Waxes are often used as \_\_\_\_\_ coatings
  
- \_\_\_\_\_ are lipids with no fatty acids
- The backbone of a sterol is made of \_\_\_\_\_ rings of carbon atoms
- Sterols are common in animals in forms such as \_\_\_\_\_, \_\_\_\_\_, and bile salts

## Proteins

- Proteins are \_\_\_\_\_ of amino acids
- Amino acids are \_\_\_\_\_ organic compounds with an amino group, and acid (\_\_\_\_\_) group, and one of \_\_\_\_\_ various "R" groups
- Proteins function as \_\_\_\_\_, hormones, \_\_\_\_\_, structure, and much, much more
  
- The \_\_\_\_\_ and structure of a protein determine its \_\_\_\_\_
- \_\_\_\_\_ structure is the ordered \_\_\_\_\_ of amino acids linked by \_\_\_\_\_ bonds to form a polypeptide chain
- The chain then collapses in on itself to create a \_\_\_\_\_-dimensional shape
- The \_\_\_\_\_ structure refers to the way the chain condenses itself as a coil or as sheet-like folds
- Helical \_\_\_\_\_ are called \_\_\_\_\_ helices, and are found in hemoglobin
- Sheet-like folds are called \_\_\_\_\_, and are found in silk
- Secondary structure comes from \_\_\_\_\_ bonds within the molecule
- The \_\_\_\_\_ structure is an additional folding due to hydrogen bonding among \_\_\_\_\_ groups of the chain
- This is like a coiled \_\_\_\_\_ cord becoming \_\_\_\_\_
- The \_\_\_\_\_ structure refers two or more \_\_\_\_\_ chains joining together to make a true protein
- Proteins are described as \_\_\_\_\_ or fibrous depending on their shape
  
- High \_\_\_\_\_ or extreme \_\_\_\_\_ changes can permanently change the shape of a protein
- Loss of shape means loss of \_\_\_\_\_, and is called " \_\_\_\_\_ "

## Nucleotide Based Molecules

A \_\_\_\_\_ is a small organic molecule with \_\_\_\_\_ distinct parts:

- Nucleotides always contain a \_\_\_\_\_ group
- There is a \_\_\_\_\_-carbon sugar: either \_\_\_\_\_ or \_\_\_\_\_
- There is a nitrogenous \_\_\_\_\_: either \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_

There are \_\_\_\_\_ types of nucleotide-based molecules:

- \_\_\_\_\_ phosphates are \_\_\_\_\_ carriers (\_\_\_\_\_, ADP, and cAMP)
- Nucleotide \_\_\_\_\_ transport H and \_\_\_\_\_ (NAD<sup>+</sup> and \_\_\_\_\_)
- \_\_\_\_\_ are \_\_\_\_\_ of nucleotides (DNA and RNA)

Nucleic Acids:

- DNA is a double-stranded \_\_\_\_\_ carrying coded genetic instructions (how to build \_\_\_\_\_)
- RNA is \_\_\_\_\_ stranded and carries out the instructions of the DNA (actually \_\_\_\_\_ the proteins)