

Macromolecules Worksheet

Protein

1. Draw and label an amino acid. Show the different functional groups.
2. List the four levels of protein folding. What defines each folding level?
3. What is fundamental to protein structure and function?

Nucleic Acids

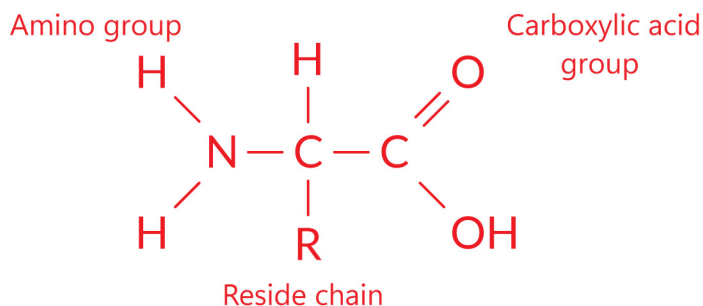
1. What makes up a nucleotide? What are the four component bases of DNA? How do the bases of RNA differ from DNA? What are the specific base pairings for each?
2. What is meant by “sugar-phosphate backbone”? How are nucleic acids formed?
3. How does the structure of DNA and RNA differ?
4. Who discovered the structure of DNA? When?

Macromolecules Worksheet

Protein

Answers

1. Draw and label an amino acid. Show the different functional groups.



2. List the four levels of protein folding. What defines each folding level?

Primary: Single chain of polypeptides

Secondary: Folding or spiral chains

Tertiary: 3D globular proteins with specific active sites

Quaternary: 2 or more globular proteins

3. What is fundamental to protein structure and function?

The sequence of amino acids and their charges determines the folding level.

Nucleic Acids

1. What makes up a nucleotide? What are the four component bases of DNA? How do the bases of RNA differ from DNA? What are the specific base pairings for each?

A nucleotide comprises a phosphate group, a five-carbon sugar, and a nitrogenous base. The four nitrogenous bases in DNA are adenine, cytosine, guanine, and thymine.

DNA and RNA are both made up of nucleotides, but they differ in the five-carbon sugar and the nitrogenous base. DNA contains the sugar deoxyribose, while RNA contains the sugar ribose. DNA contains the nitrogenous base thymine, while RNA contains the uracil.

In DNA, adenine (A) always pairs with thymine (T) (A-T), and cytosine (C) pairs with guanine (G) (C-G). RNA is the same, except that adenine always pairs with uracil (U) (A-U).

2. What is meant by “sugar-phosphate backbone”? How are nucleic acids formed?

The chain of DNA molecules is formed by covalent phosphodiester bonds between the phosphate group of one nucleotide and the sugar of the next nucleotide. The side chains of a DNA double helix are the phosphate-sugar-phosphate-sugar...

3. How does the structure of DNA and RNA differ?

DNA is generally a long double chain of nucleotides and helical (T). RNA is generally a single chain and short (U).

4. Who discovered the structure of DNA? When?

James Watson and Frances Crick (using work from Edmond Chargaff, Rosalind Franklin, and Maurice Wilkens) determined the DNA structure on February 28, 1953.