I'm not a bot

Download myCBSEguide mobile app to access CBSE Sample Papers 2024-25, NCERT Solutions (Revised), Most Important Questions, Previous Year Question Bank, Mock Tests, and Detailed Notes. Install NowCBSE Biology Chapter 9 Biomolecules class 11 Notes Biology are available for free download in the app, providing quick preparation for CBSE exams and school-based annual examinations. Class 11 Biology notes Chapter 9 Biomolecules can be downloaded as PDF, helping students revise the whole chapter in minutes. These revision notes were prepared by a team of expert teachers and are recommended to be used during exam days.Biomolecules class 11 Notes Biology CBSE Quick Revision NotesCBSE Class 11 Biology Chapter 9 Biomolecules defines biomolecules as chemicals or molecules present in living organisms, divided into two types: inorganic and organic. Inorganic biomolecules include minerals, gases, and water, while organic biomolecules comprise carbohydrates, fats, proteins, nucleic acids, vitamins, etc. The amino acids, nucleotides, and fatty acids can be classified as biochemical forms. Except lipids, macromolecules are formed by polymerization of sub-units called monomers. Proteins are polymers of amino acids, linked by peptide bonds formed by dehydration between COOH and NH3 groups with the removal of H2O. Nucleic acids form 3’-5’ phosphodiester bonds between nucleosides, releasing two water molecules. Polysaccharides link mono-saccharides through glycosidic bonds, forming helical secondary structures. Carbohydrates (Polysaccharides) include starch, cellulose, and glycogen, with starch serving as a storehouse of energy in plants. Primary Structure, Secondary Structure, Tertiary Structure, Quaternary Structure, Nucleic Acids, Biomolecules, Metabolism, Enzymes The primary structure of protein refers to the sequence of amino acids that comprise the polypeptide chain. The first and last amino acids are designated as the N-terminal and C-terminal amino acids, respectively. Secondary structures include α-helix, β-pleated sheet, and collagen. Tertiary structure involves the folding of the polypeptide chain into a three-dimensional shape. Quaternary structure refers to the arrangement of multiple polypeptide chains in protein subunits. Nucleic acids consist of heterocyclic compounds, polysaccharides, and phosphate or phosphoric acid molecules. There are two primary types: DNA (Deoxyribonucleic Acid) containing deoxyribose sugar, and RNA (Ribonucleic acid) containing ribose sugar. Biomolecules undergo continuous changes through metabolic processes, which involve enzyme-catalyzed reactions. Enzymes facilitate chemical reactions without undergoing structural changes. These proteins serve as catalysts in living organisms, with the exception of nucleic acids, which can exhibit enzymatic properties. The balance between biosynthetic (anabolic) and catabolic pathways is essential for maintaining homeostasis in living organisms. ATP is the primary energy currency in living systems, allowing organisms to maintain a non-equilibrium steady state. Enzyme activity is influenced by several factors, including temperature. High temperatures can damage enzymes, while low temperatures can slow their activity. enzyme activity is temperature dependent with an optimal temperature range, above or below which the enzyme becomes less active. The pH level also affects enzymes, each having its optimal acidity for maximum effectiveness. Increasing substrate concentration enhances reaction rate due to more active sites occupied by molecules. Inhibitors interfere with enzymatic function when they resemble substrates. Enzymes are categorized into six types: oxidoreductases/dehydrogenases, transferases, hydrolases, lyases, isomerases, and ligases. Co-factors include non-protein components that enhance enzyme activity, such as prosthetic groups, often derived from vitamins like niacin. 1. Glycosidic, peptide, and phosphodiester bonds illustrate the chemical linkages between different biomolecules. A glycosidic bond forms by removing a molecule of water from monosaccharide units in disaccharides, oligosaccharides, and polysaccharides. Peptide bonds are formed through the reaction between carboxyl (- COOH) groups of amino acids and amino (- NH2) groups with the elimination of water. Phosphodiester bonds join phosphate groups and sugar groups in adjacent nucleotides by means of an oxygen bridge. 2. The tertiary structure of proteins is a complex, specific shape formed when polypeptide molecules fold on themselves. This structure hides non-polar amino acid chains inside and exposes polar side chains to form active sites for enzymatic proteins. Tertiary structure is maintained by weak bonds like hydrogen, ionic, disulphide, and hydrophilic – hydrophobic interactions. 3. Small molecular weight biomolecules include minerals (sodium, potassium, calcium), gases (O2, N2, CO2, NH3), sugars (ribose, deoxyribose, glucose, fructose), lipids, amino acids, and nucleotides (pyrimidines & purine). 4. Examples of small molecular weight biomolecules include sodium, oxygen, carbon dioxide, and sugars such as ribose, deoxyribose, glucose, and fructose. 5. Proteins have primary structures, and determining the sequence of amino acids can reveal information about their purity or homogeneity. Frederick Sanger's reagent helps identify the amino acid sequence in polypeptide chains by forming a dinitrophenyl (DNP) derivative with N-terminal amino acids. 6. Therapeutic proteins include thrombin, fibrinogen, enkephalins, antigens, antibodies, streptokinase, protein tyrosine kinase, diastase, renin, insulin, oxytocin, and vasopressin. Proteins are also used in cosmetics, dairy industries, textile industries, research techniques, and as biological buffers. Can you explain why neutral fats are composed of carbon, hydrogen, and oxygen but have fewer oxygen atoms than carbohydrates? Glycerol is a glycerol molecule with three carbons, each bearing a hydroxyl (-OH) group. Fatty acids are unbranched chains of carbon atoms with each carbon atom forming four bonds to other atoms. The carboxyl group (COOH) at one end and hydrogen atom bonded to most carbon atoms form a hydrogen chain. This non-polar chain does not dissolve in water, while the polar C = O and OFI groups tend to dissolve it. Plant triacylglycerols have more unsaturated fatty acids than animal ones. Given article text here The Chemical Composition Analysis of Living Organisms ========== Chemical composition analysis is a crucial step in understanding the organic compounds present in living organisms. The process involves identifying and isolating specific biomolecules from various biological samples. Detecting Ammonia and Amines ---------- A specific chemical, dihydroxy indane-l,3-dione, is used to detect ammonia or primary and secondary amines. When these free amines react with the chemical, Ruhemann’s purple is produced, indicating their presence. Amino Acid Analysis ---------- Ninhydrine is used for amino acid analysis of proteins. Most amino acids, including α-amino acids, are hydrolyzed and reacted with ninhydrin, except proline, a secondary amine. Amino acids containing both a free amino group and a free carboxylic acid group react with ninhydrin to produce a colored product. Solubility Tests ---------- Fats and oils can be tested for solubility in lighter fluid versus water. In this test, 5 drops of fat or oil are added to two separate test tubes containing 10 drops of lighter fluid and 10 drops of cold water. A positive result indicates that the fat dissolves in the lighter fluid. Urine Analysis ---------- Urine contains proteins, which can be analyzed for protein content using various techniques. Cellulose Production ---------- About 100 billion tonnes of cellulose are produced annually by plants worldwide. Enzyme Properties ---------- Enzymes have several important properties: * High molecular weight complex globular proteins * Accelerate chemical reactions, but do not start them * Temporarily combine with substrate molecules * Reversible and specific in action * Thermolabile (heat sensitive) and exhibit optimal activity at a specific temperature and pH Analyzing Chemical Composition ---------- To analyze the chemical composition of living organisms, scientists use various techniques: * Grinding biological tissue in trichloroacetic acid to obtain a thick slurry * Straining the mixture through cheesecloth or cotton to separate the acid-soluble pool (filtrate) and acid-insoluble fraction (retentate) * Isolating and purifying specific compounds using separation techniques * Applying analytical techniques to determine molecular formula and probable structure of the compound Understanding biomolecules is essential for grasping the chemical composition of living organisms. Analyzing these compounds can provide valuable insights into their structure, function, and behavior in various biological processes. Living organisms are composed not only of organic elements but also various inorganic ones. To verify this, one can conduct a slightly modified yet destructive experiment. This involves measuring and drying a small sample of living tissue (such as a leaf or liver), which yields both wet and dry weights after water evaporation. Upon further processing where the entire sample is burnt, all carbon-based compounds are converted into gases like CO2 and water vapor, leaving behind ash that contains inorganic elements such as calcium and magnesium. Additionally, acid-soluble fractions can reveal inorganic compounds such as sulphates and phosphates. Through elemental analysis, one can determine the composition of living tissues in terms of hydrogen, oxygen, chlorine, carbon, etc., while compound analysis provides insight into their weight percentages. This process is crucial for understanding both organic (like aldehydes and ketones) and inorganic constituents present in living tissues from a chemical perspective. From a biological viewpoint, these compounds can be categorized as amino acids, nucleotide bases, fatty acids, etc. Amino acids are fundamental to this classification, as they contain an amino group and an acidic group attached to the same carbon atom (the α-carbon), hence the name α-amino acids. Each amino acid has four substituent groups: hydrogen, a carboxyl group, an amino group, and a variable R group. Please find the relevant information regarding NCERT Class 11 Biology in the accompanying attachment, specifically focusing on the topic of Biomolecules.

Biomolecules class 11 biology full chapter in english. Biology class 11 chapter 1 cell structure and function. What is biomolecules in biology class 11. Class 11 biology chapter 1 full explanation. Biomolecules class 11 biology complete chapter. What are the chapters in class 11 biology. Biomolecules class 11 biology full chapter pdf. Notes of biology class 11 chapter biomolecules.