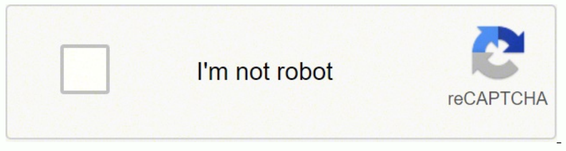

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Macromolecule comparison table worksheet answers pdf answers answer

Table 1
Matrixes Used in the Invention

Matrix	Linear poly-acrylamide (%w/w)	Denaturant composition	Buffer Composition
MegaBACE Gel Matrix (HEC) (Amersham/ Pharmacia)	-	6M urea, 10% (w/w) formamide	30mM Tris:100mM TAPS: 1mM EDTA
MegaBACE™ Long read matrix (Amersham/ Pharmacia)	3%	6M urea	30mM Tris:100mM TAPS: 1mM EDTA
LPA formulation LPA-PYR	2.0%	6M urea, 20% (w/w) 2-pyrrolidinone	30mM Tris:100mM TAPS: 1mM EDTA
LPA formulation LPA-DMA	2.0%	6M urea, 20% (w/w) N',N'-dimethylacetamide	30mM Tris:100mM TAPS: 1mM EDTA
LPA formulation LPA-DMF	2.0%	6M urea, 20% (w/w) N', N'-dimethylformamide	30mM Tris:100mM TAPS: 1mM EDTA

Do

Synthesis of Macromolecules
Organization for Matter and Energy Flow in Organisms

Macromolecule Structure and Function

Activity, continued

Part I: Macromolecule Structure and Function, continued

Macromolecule: Carbohydrate		
Test Tube	**Observations**	**Conclusion**
A1		
B1		
A2		
B2		
Water		

Macromolecule: Protein		
Test Tube	**Observations**	**Conclusion**
A		
B		
C		
D		
Water		

Macromolecule: Lipid		
Sample	**Observations of Transparency (1-highly transparent, 5-not at all transparent)**	**Conclusion**
A	Transparency Level: 1 2 3 4 5	
B	Transparency Level: 1 2 3 4 5	
C	Transparency Level: 1 2 3 4 5	
Water	Transparency Level: 1 2 3 4 5	

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Organic Chemistry Homework 4 - Macromolecules

Name : ..... Marks : / 55

Class : ..... Date : .....

Paper 2 *[Structured and Free Response Questions]*

Section A *[Structured Questions]*

1 The following terms can be used to describe organic compounds.

alcohol	**alkene**	**carboxylic acid**	**hydrocarbon**
alkane	**amide**	**ester**	**polymer**

From this list, choose two terms which can be applied to each of the following compounds. The same term may be used more than once.

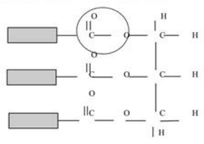
(a) butene: alkene and hydrocarbon

(b) poly(ethene): polymer and hydrocarbon

(c) nylon: polymer and amide

(d) terylene: polymer and ester

2 A simplified structure of a fat molecule is drawn below.



(a) Fat is a macromolecule found in food. Name **two** other types of macromolecule found in food.

Do

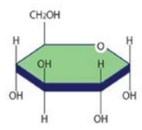
Synthesis of Macromolecules
Organization for Matter and Energy Flow in Organisms

Macromolecule Structure and Function

Activity

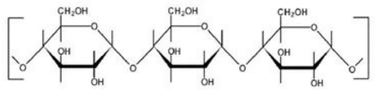
Part I: Macromolecule Structure and Function

You are a scientist in the "Keep it Simple" laboratory, and you analyze evidence from Simple Land. You study biological monomers, including amino acids and nucleotides. Somehow, your research leaks to the Internet. From your research, scientists in Complex City learn how to synthesize simple biological monomers from inorganic precursors. They have decided to take your advice and have created four different polymers they have named "macromolecules." The scientists have created these macromolecules, but they have gotten things mixed up and they do not know which samples contain which macromolecules. They need your help sorting out their samples. You accept a sizeable salary to help them achieve their goal. You have brought with you testing supplies that you know are needed to identify carbohydrate monomers and polymers, proteins, and lipids. You have also brought along model-building supplies to help them understand nucleic acids.



To help the Complex City scientists when you cannot be there, you have decided to develop a macromolecule Comparison Chart that compares the characteristics of each macromolecule. This tool will help the Complex City scientists compare the structure and function of each macromolecule and document your excellent work.

Use the Reference Sheet located at each station to perform each set of tests. Record your results on your Student Handout, along with the evidence for each macromolecule in the macromolecule Comparison Chart.



Polysaccharide - Starch

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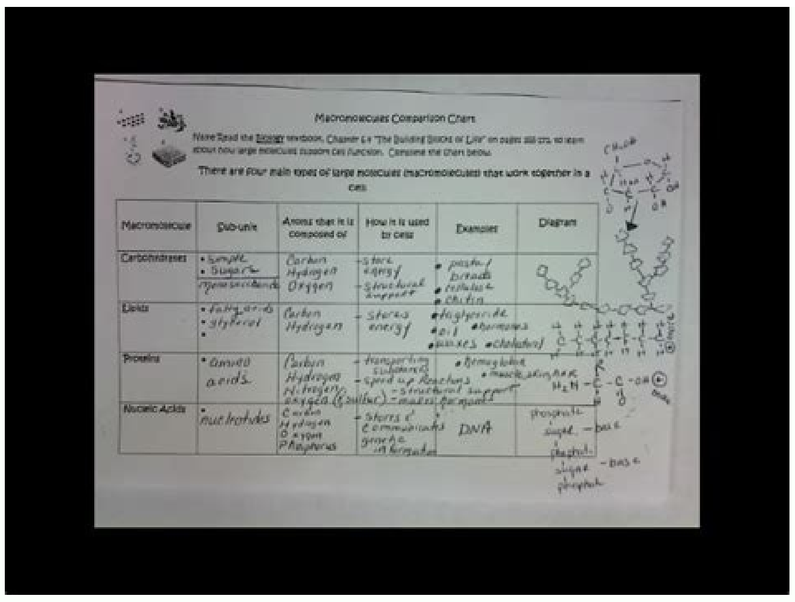

Dehydration and hydrolysis reactions are similar for all macromolecules, but each monomer and polymer reaction is specific to its class. Transcript Macromolecule Comparison Chart Organic molecules are based on CARBON. Figure 2. Proteins are broken down by the enzymes pepsin and peptidase, and by hydrochloric acid. Lipids are broken down by lipases. At the same time, the monomers share electrons and form covalent bonds. Note that this reaction is the reverse of the synthesis reaction shown in Figure 1. Biological macromolecules are organic, meaning they contain carbon. A monomer joins with another monomer with the release of a water molecule, leading to the formation of a covalent bond. Dehydration and hydrolysis reactions are catalyzed, or "sped up," by specific enzymes; dehydration reactions involve the formation of new bonds, requiring energy, while hydrolysis reactions break bonds and release energy. Even one kind of monomer can combine in a variety of ways to form several different polymers: for example, glucose monomers are the constituents of starch, glycogen, and cellulose. The polymer is more than the sum of its parts: it acquires new characteristics, and leads to an osmotic pressure that is much lower than that formed by its ingredients; this is an important advantage in the maintenance of cellular osmotic conditions. For instance, carbohydrates are broken down by amylase, sucrase, lactase, or maltase. In the dehydration synthesis reaction depicted above, two molecules of glucose are linked together to form the disaccharide maltose. These types of reactions are known as dehydration or condensation reactions. Combined, these molecules make up the majority of a cell's dry mass (recall that water makes up the majority of its complete mass). Check Your Understanding Answer the question(s) below to see how well you understand the topics covered in the previous section. Each is an important cell component and performs a wide array of functions. No rubric included- the rigor level of the organizer can varied based on class, student need, or teacher preference; because of this, the rubric varies and can be easily developed by the teacher. Hydrolysis Polymers are broken down into monomers in a process known as hydrolysis, which means "to split water," a reaction in which a water molecule is used during the breakdown (Figure 2). Proteins, carbohydrates, nucleic acids, and lipids are the four major classes of biological macromolecules—large molecules necessary for life that are built from smaller organic molecules. In a dehydration synthesis reaction (Figure 1), the hydrogen of one monomer combines with the hydroxyl group of another monomer, releasing a molecule of water. This type of reaction is known as dehydration synthesis, which means "to put together while losing water." Figure 1. As additional monomers join, this chain of repeating monomers forms a polymer. Breakdown of these macromolecules provides energy for cellular activities. You are What You Eat Comparing the Biological Macromolecules Macromolecule Basic Formula, key features Monomer Examples Uses Proteins CHON −NH2 + −COOH +R group Amino acids Enzymes, some hormones Storage; Signals; Structural; Contractile; Defensive; Enzyme; Transport; Receptors Lipids C:H:O Greater than 2:1 H:O (carboxyl group) Fatty acid and glycerol Butter, oil, cholesterol, beeswax Energy storage; Protection; Chemical messengers; Repel water Carbohydrates C:H:O 1:2:1 Monosaccharides Glucose, Fructose, Starch, Glycogen, Cellulose Energy storage; Structure Nucleic Acids CHONP pentose, nitrogenous base, phosphate Nucleotides DNA, RNA Genetic information Dehydration Synthesis Most macromolecules are made from single subunits, or building blocks, called monomers. As we've learned, there are four major classes of biological macromolecules: Proteins (polymers of amino acids) Carbohydrates (polymers of sugars) Lipids (polymers of lipid monomers) Nucleic acids (DNA and RNA; polymers of nucleotides) Let's take a closer look at the differences between the difference classes. In the hydrolysis reaction shown here, the disaccharide maltose is broken down to form two glucose monomers with the addition of a water molecule. These reactions are similar for most macromolecules, but each monomer and polymer reaction is specific for its class. Each macromolecule is broken down by a specific enzyme. Organic Building important? During these reactions, the polymer is broken into two components: one part gains a hydrogen atom (H+) and the other gains a hydroxyl molecule (OH–) from a split water molecule. Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section. Macromolecules, Elements Subunits Functions: Examples: *From the Biomolecules, Periodic Table Monomers, Why are Where can we of Elements they find them? Compunds Blocks C,H,O *Starch Carbohydrates are *Shortterm energy Carbohydrates Carbon, hydrogen, *Glycogen (liver) built by combining storage oxygen 1:2:1 ratio Ex: C6H12O6 Glucose (simple sugar) Lipids: Fats monosaccharides *Quickrelease (simple sugars) energy C,H, very Fatty Acids little O Carbon, hydrogen, very little oxygen Nucleic Acids Found in the cell nucleus Proteins *Insulation: store body heat *Protection: cell membranes *Longterm energy storage C,H,O,N, Nucleotides Store and made of: P transmit 1) Nitrogen base Carbon, Hydrogen Oxygen, Nitrogen 2) Sugar compound genetic 3) Phosphate group Phosphorus information C,H,N,O, P,S Carbon, hydrogen, nitrogen, oxygen, phosphorus, sulfur Amino Acids *Joined by peptide bonds to form a polypeptide chain (protein) *Change the rate of chemical reactions (enzymes) *regulate cell processes *Give bodies structure *Transport materials into and out of the cell Ex: oxygen (hemoglobin) *Sugars – glucose, fructose, sucrose *Celluose – plant cell walls Test(s) Iodine: turns purple/blue in the presence of starch Benedict's Solution: turns copper in the presence of simple sugars such as glucose Fats Oils Waxes Steroids Cholesterol Brown Paper Bag Test Sudan III/IV DNA Deoxyribonucleicacid Sugar: deoxyribose RNA Ribonucleicacid Sugar: ribose None (Turns fats red) Biuret Test: blue *Enzymes End in "ase" solution turns violet in the presence of *Hemoglobin proteins or any molecule with peptide bonds Graphic organizer for the major macromolecule: Proteins, Carbohydrates, Lipids, Nucleic acids Can be used as a notes page, activity, review, study aid, or warm up depending on the progress of the class. Dehydration reactions typically require an investment of energy for new bond formation, while hydrolysis reactions typically release energy by breaking bonds. The monomers combine with each other using covalent bonds to form larger molecules known as polymers. When polymers are broken down into smaller units (monomers), a molecule of water is used for each bond broken by these reactions; such reactions are known as hydrolysis reactions. In doing so, monomers release water molecules as byproducts. This short quiz does not count toward your grade in the class, and you can retake it an unlimited number of times. Macromolecules are made up of single units known as monomers that are joined by covalent bonds to form larger polymers. This allows for easy absorption of nutrients by cells in the intestine. In addition, they may contain hydrogen, oxygen, nitrogen, and additional minor elements. In the process, a water molecule is formed. Different types of monomers can combine in many configurations, giving rise to a diverse group of macromolecules. Learning Objectives Define the term "macromolecule" Distinguish between the 4 classes of macromolecules Now that we've discussed the four major classes of biological macromolecules (carbohydrates, lipids, proteins, and nucleic acids), let's talk about macromolecules as a whole. For example, in our bodies, food is hydrolyzed, or broken down, into smaller molecules by catalytic enzymes in the digestive system.

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