

Applied Practice

***Cellular Chemistry
and Metabolism
STAAR Biology EOC***

RESOURCE GUIDE

Volume 7

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APPLIED PRACTICE
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Cellular Chemistry and Metabolism
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Glossary of Terms

Activation energy – the minimum amount of energy that must be put into a chemical system in order for a chemical reaction to occur

Active site – the site on an enzyme where substrate molecules bind and undergo a chemical reaction

Amino acid – a molecule with an amine (NH₂) and carboxyl (-COOH) functional group along with a side chain group unique to each molecule. There are 22 total side chain groups. Amino acids primarily function as the monomers for biological macromolecules called proteins.

Adenosine Triphosphate (ATP) – a molecule found in organisms that serves as the primary source for energy within cells for metabolism. ATP is often called the “energy currency” for cellular processes. ATP consists of an adenine nucleotide, a ribose sugar, and three phosphate groups.

Autotroph – an organism that can produce complex organic compounds such as carbohydrates which are used as food for all organisms

Carbon Dioxide – a naturally occurring chemical compound of carbon and oxygen atoms that exists in earth’s atmosphere as a gas at standard temperature and pressure. It serves as the primary source of carbon for the production of simple sugars by plants through the process of photosynthesis.

Carbohydrate – an organic compound comprised of carbon, hydrogen, and oxygen atoms covalently bonded together that serves a variety of roles in biological organisms, including storage of energy and acting as a structural component

Catalyst – a molecule that will change the rate of a chemical reaction without being consumed by the reaction

Chemical reaction – a process that leads to the transformation of one set of chemical substances to another

Cellular respiration – a series of biological reactions that take place in the cells of organisms to convert stored chemical energy from sugar into the bonds of ATP

Dehydration synthesis – a chemical reaction that involves the loss of water molecules between two substances, resulting in the formation of a chemical bond

Enzyme – large biological molecules made from proteins that are responsible for the thousands of chemical processes and metabolic pathways that sustain life

Enzyme-Substrate-Complex – a chemical association that is formed when the substrate of a chemical reaction binds to the active site on an enzyme

Fatty acids – long chains of saturated or unsaturated carbon molecules attached to a carboxylic acid head. They serve as sources of fuel for biological organisms and are one part of structural lipids that make up the plasma membrane of cells.

Choose the best answer to each question.

1 Which of the following biomolecules share the function of storing energy in living organisms?

- A** Lipids and proteins
 - B** Carbohydrates and lipids
 - C** Carbohydrates and nucleic acids
 - D** Nucleic acids and proteins
-

2 The elements carbon, hydrogen, and oxygen are components of which of the following biomolecules?

- F** Carbohydrates
 - G** Lipids
 - H** Proteins
 - J** All of the above
-

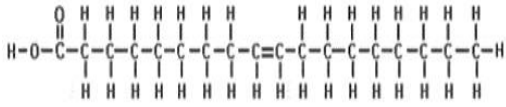
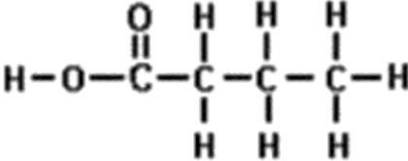
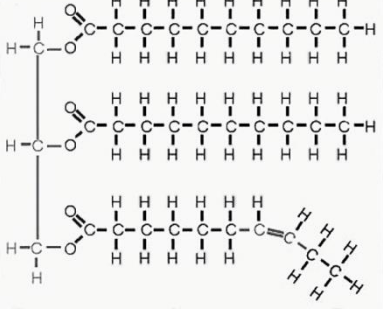
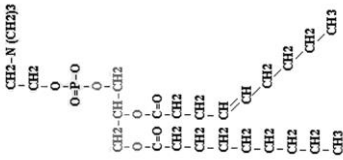
3 Which of the following statements is true for both carbohydrates and proteins?

- A** Carbohydrates and proteins are polymers of smaller subunits.
- B** Carbohydrates and proteins are made of simple sugars.
- C** Carbohydrates and proteins are made of amino acids.
- D** Carbohydrates and proteins are composed of the elements carbon, hydrogen, oxygen, and nitrogen.

4 All of the following biomolecules serve as structural components in cellular membranes and cell walls except —

- F proteins
- G lipids
- H carbohydrates
- J nucleic acids

5 Which of the lipids pictured below is a major structural component of cellular membranes?

 <p style="text-align: center;">Fatty Acid</p>	 <p style="text-align: center;">Glycerol</p>
 <p style="text-align: center;">Triglyceride</p>	 <p style="text-align: center;">Phospholipid</p>

- A Fatty acid
- B Glycerol
- C Triglyceride
- D Phospholipid

6 Which two biomolecules are most responsible for the expression of genetic traits in organisms?

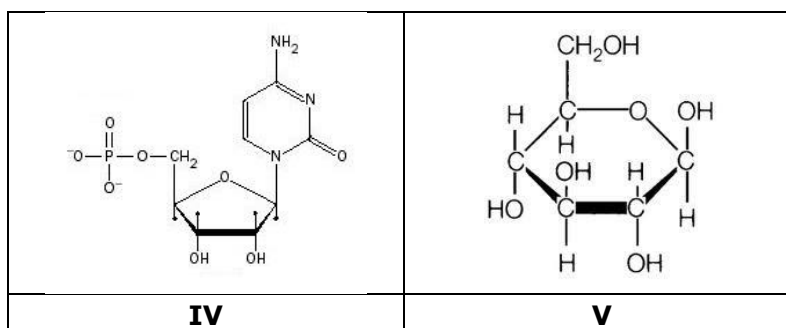
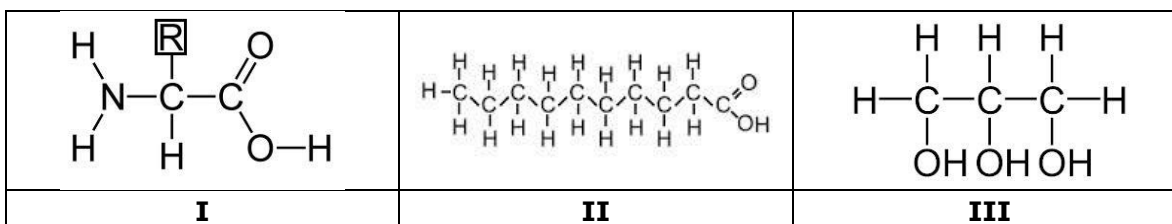
F Carbohydrates and nucleic acids

G Nucleic acids and proteins

H Lipids and proteins

J Lipids and nucleic acids

Use the following pictures to answer questions 7–10.



7 Which two molecules above are structural subunits of some lipids?

A I and III

B II and V

C II and III

D IV and V