

2.3 Organic Molecules

Visual Quiz

Identify each molecule pictured below as one of the following: *amino acid*, *monosaccharide*, *complex carbohydrate*, *lipid*, and *nucleotide*. Then, explain which physical features of each molecule helped you to identify it.

A.



1. What type of molecule is shown in 'A'?

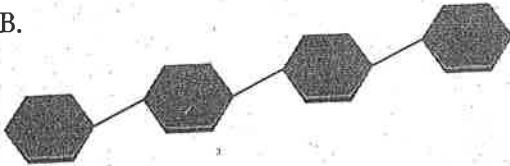
LIPID

2. How can you tell?

GLYCEROL

3 fatty ACIDS

B.



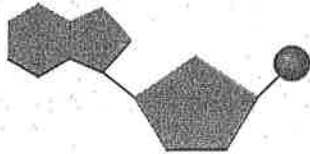
3. What type of molecule is shown in B?

POLYSACCHARIDE

4. How can you tell?

LONG CHAIN OF MONOSACCHARIDES

C.



5. What type of molecule is shown in C?

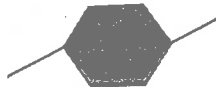
NUCLEOTIDE

6. How can you tell?

PHOSPHATE, PENTOSE SUGAR

NITROGENOUS BASE

D.



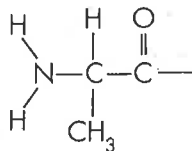
7. What type of molecule is shown in D?

MONOSACCHARIDE

8. How can you tell?

HEXOSE SUGAR (SIMPLE SUGAR)

E.



9. What type of molecule is shown in E?

AMINO ACID

10. How can you tell?

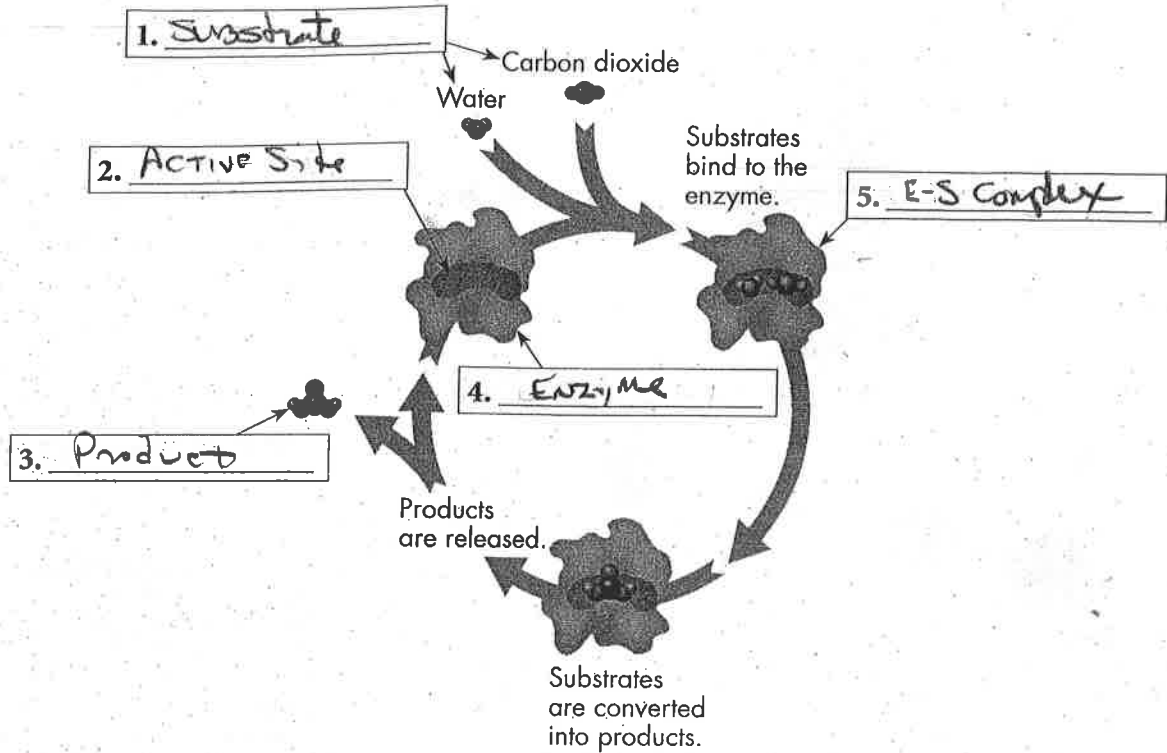
AMINO GROUP, CARBOXYL GROUP,

H-GROUP, R-GROUP.

2.4 Enzymatic Reactions

Visual Quiz

Label the diagram below with the following terms: *active site*, *enzyme*, *enzyme-substrate complex*, *product*, and *substrate*. Then, answer the questions below.

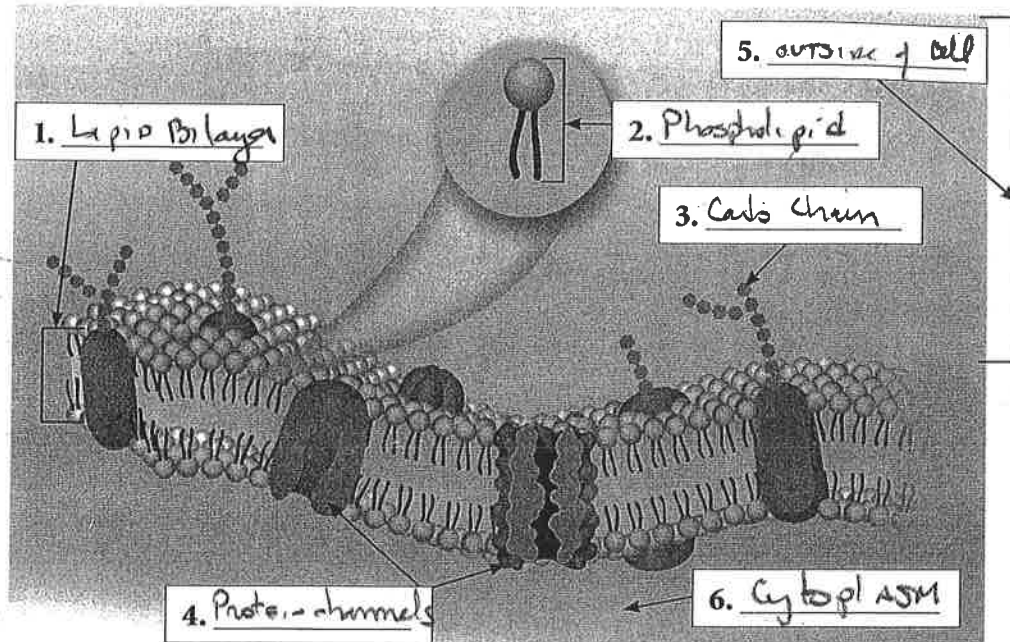


6. What type of organic molecule are enzymes? (proteins, lipids, carbohydrates, or nucleic acids)
Proteins
7. What do enzymes do in cells?
Catalysts that speed up chemical rxns
8. What is activation energy?
NEG needed to start a rxn
9. How do enzymes affect activation energy?
lower ACT. NEG.
10. What factors can affect the activity of an enzyme?
Temp, pH, Regulatory Molecules

7.2 Cell Membranes

Visual Quiz

Label the diagram with the following terms: *carbohydrate chain*, *cytoplasm*, *lipid*, *lipid bilayer*, *protein channels*, and *outside of cell*. Then, answer the questions that follow.



7. Lipids have a hydrophobic part and a hydrophilic part. Explain how these properties affect their ability to form a bilayer.

Hydrophilic ends attracted to H₂O
 Hydrophobic ends attract each other

8. What is selective permeability? Why is it important to cells? EXPLAIN IN TERMS OF SIZE + POLARITY

only certain things get thru membrane
 small, nonpolar (get thru); large, polar don't

9. What is the function of protein channels in the cell membrane?

Allow large, polar molecules to move across

10. Why are cell membranes described as a "fluid mosaic"?

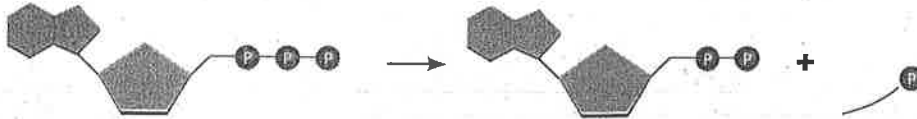
Fluid: Proteins move laterally back & forth
 Mosaic: Made of proteins, carbs, fats

8.1 ATP

Visual Quiz

Label each part of the reactions in the diagrams below with the following terms: *ATP*, *ADP*, and *phosphate group*. Then, answer the questions below.

Reaction #1:



1. ATP

2. ADP

3. (P) group

Reaction #2:



4. ADP

5. P-group

6. ATP

7. Which reaction shows ATP releasing its energy? How can you tell?

#1 when 3rd P-group is broken, wat released

8. Which reaction shows energy being stored in a molecule of ATP? How can you tell?

#2 neg stored in the bond

9. What are some activities that cells engage in that require energy?

Protein Synthesis, Active transport, Movement

10. From where do cells obtain the energy they need to make ATP?

From NRE in bonds of glucose

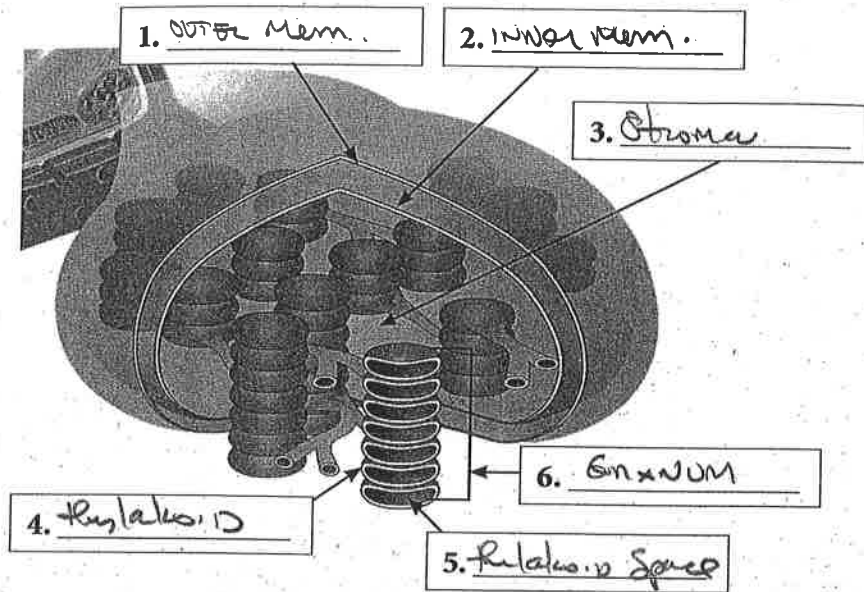
11. How is ATP like a rechargeable battery?

Made up of ADP + P group → ATP.

8.2 Chloroplast Structure

Visual Quiz

Label the diagram with the following terms: *granum*, *inner membrane*, *outer membrane*, *thylakoid membrane*, *thylakoid space*, and *stroma*. Then, answer the questions below.



7. Where is chlorophyll found? Use the diagram to explain your answer.

inside thylakoid

8. What colors of light does chlorophyll absorb? What does it reflect?

all but green (red/blue) green

9. Where do the light-dependent reactions of photosynthesis occur?

thylakoid

10. Where do the light-independent reactions of photosynthesis occur?

stroma

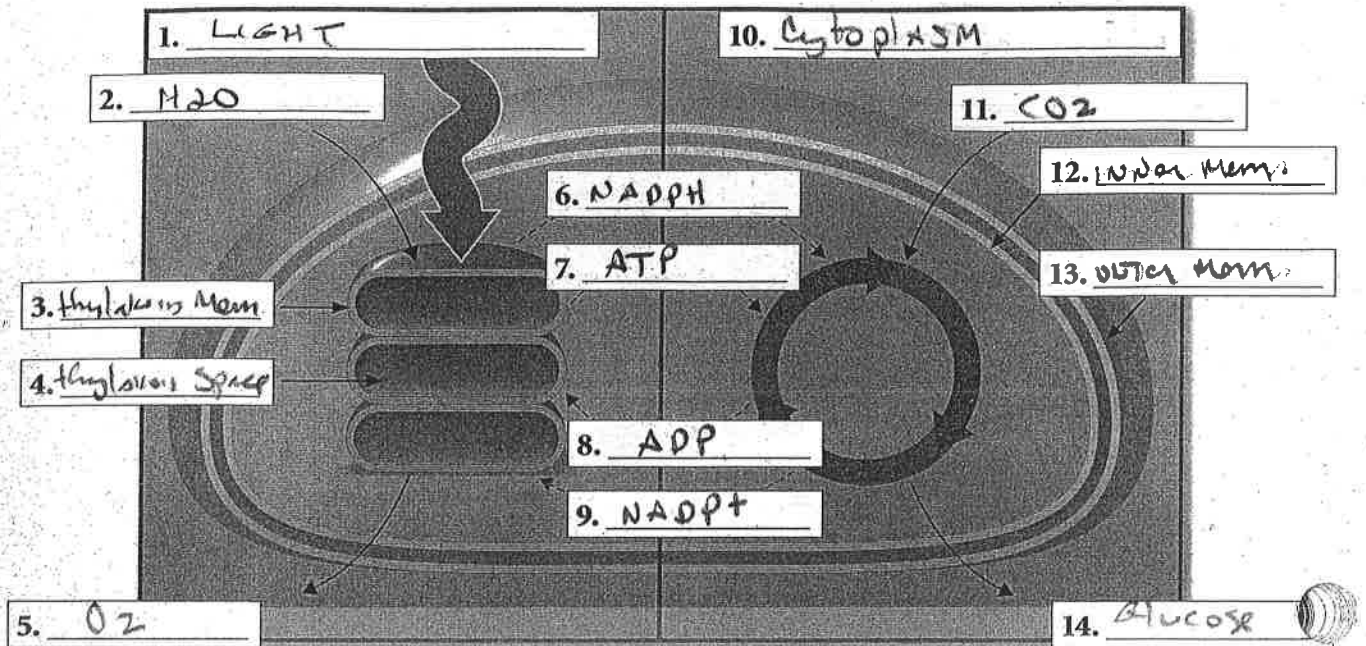
11. What role do electron carrier molecules play in photosynthesis?

carry high energy e- from chloroplast & carry them to dark areas to make glucose.

8.3 Photosynthesis

Visual Quiz

Label the diagram with the following terms: *ADP*, *ATP*, *carbon dioxide*, *chloroplast inner membrane*, *chloroplast outer membrane*, *glucose*, *light-dependent reactions*, *light-independent reactions*, *NADP⁺*, *NADPH*, *oxygen*, *thylakoid membrane*, *thylakoid space*, and *water*. Then, answer the questions below.



15. Where are molecules of chlorophyll found?

thylakoid

16. What is the function of NADP^+ in photosynthesis?

to pick up & carry high level e^-

17. Briefly explain what happens in the light-dependent reactions.

use light + H_2O to make ATP, NADPH, + O_2

18. Briefly explain what happens in the light-independent reactions.

use ATP, NADPH + CO_2 to make O_2 + glucose

19. From where do plants obtain the carbon dioxide they need?

atmosphere (CO_2 from air resp)

9.2 Cellular Respiration

Visual Quiz

Label each of the three stages of cellular respiration shown in the diagram. Write how many molecules of ATP are usually made during each stage and where it takes place within the cell. Then, answer questions 10–14.

1. Stage of cellular respiration:
Glycolysis

2. Where this takes place:
Cytoplasm

3. Number of ATP molecules made:
2

4. Stage of cellular respiration:
Krebs Cycle

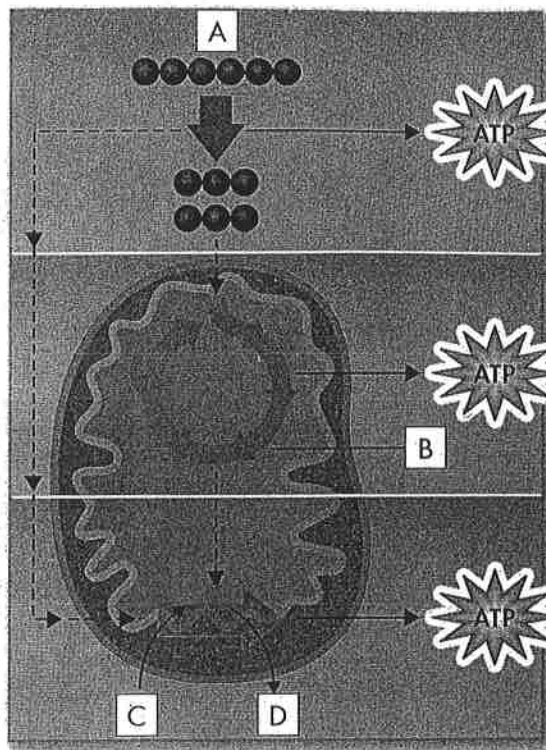
5. Where this takes place:
Mitochondrion

6. Number of ATP molecules made:
2

7. Stage of cellular respiration:
ETC

8. Where this takes place:
Cristae

9. Number of ATP molecules made:
34

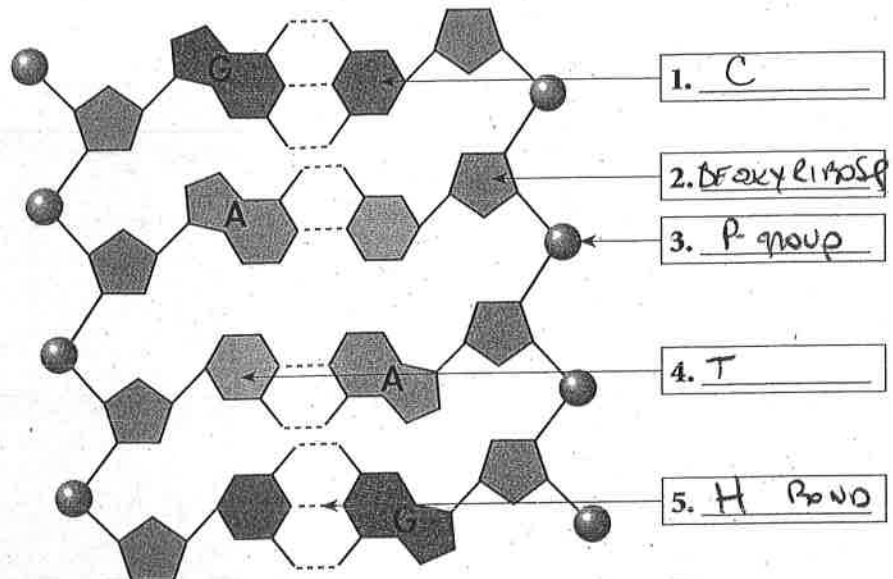


10. What is the name of substance A? What is its role in cellular respiration?
Glucose; Provides NRG for cell resp
11. What is the name of substance B? What is its role in cellular respiration?
CO₂; Byproduct
12. What is the name of substance C? What is its role in cellular respiration?
O₂; Combines w/ H⁺ To form H₂O
13. What is the name of substance D? What is its role in cellular respiration?
H₂O; Formed at end of ETC
14. What would occur if there was a sudden shortage of substance A within the cell?
Glycolysis slows; less ATP & pyruvate

12.2 The Structure of DNA

Visual Quiz

Label the diagram with the following terms: *cytosine*, *deoxyribose*, *hydrogen bond*, *phosphate group*, and *thymine*. Then, answer the questions below.



6. Explain the difference between a nucleic acid and a nucleotide.

↓ polymer ↓ monomer

7. Why are the two DNA strands said to be "antiparallel"? Use the diagram to explain your answer.

P-group of one strand opposite sugar of other

8. What role do hydrogen bonds play in the structure of DNA?

Hold 2 strands together. B/W bases

9. What is explained by Chargaff's rule?

A = T C = G

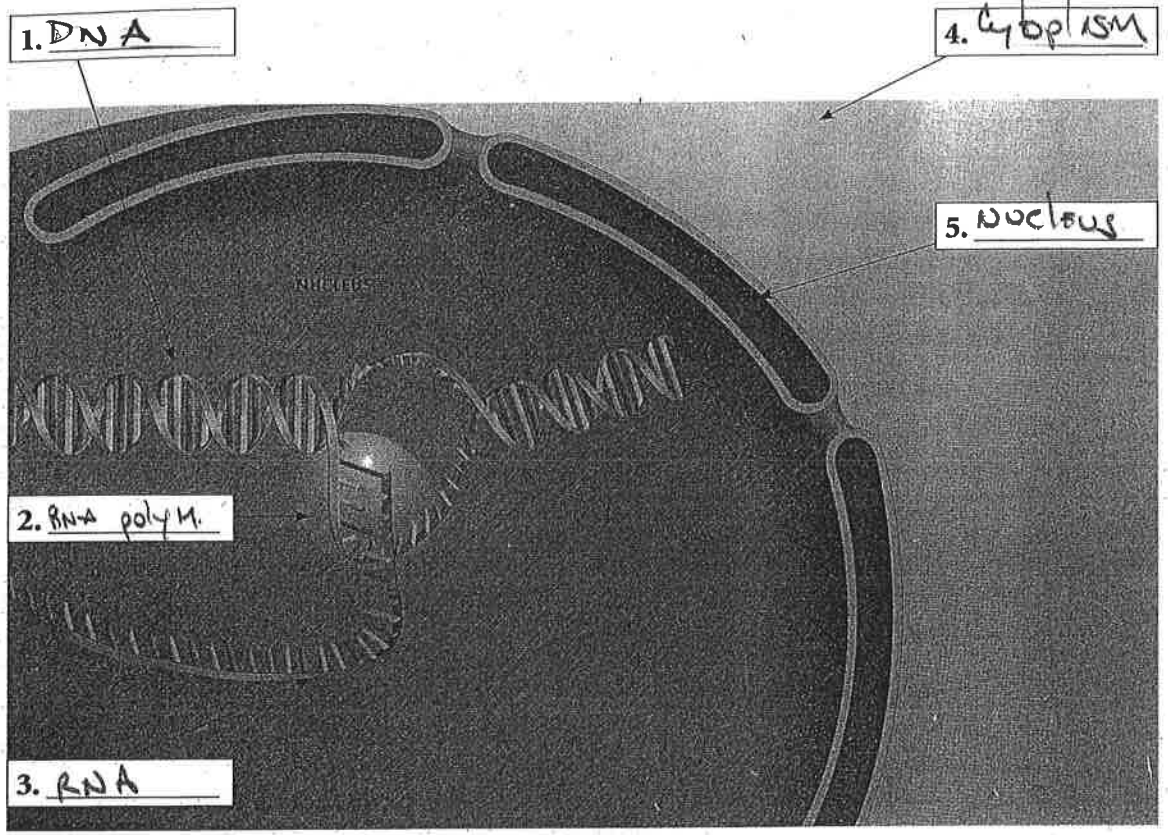
10. Explain, using the diagram, where nitrogenous bases are found within a DNA strand.

Center of molecule

13.2 RNA Synthesis and Coding

Visual Quiz

Label the diagram with the following terms: *cytoplasm*, *DNA*, *nucleus*, *RNA*, and *RNA polymerase*. Then, answer the questions below.

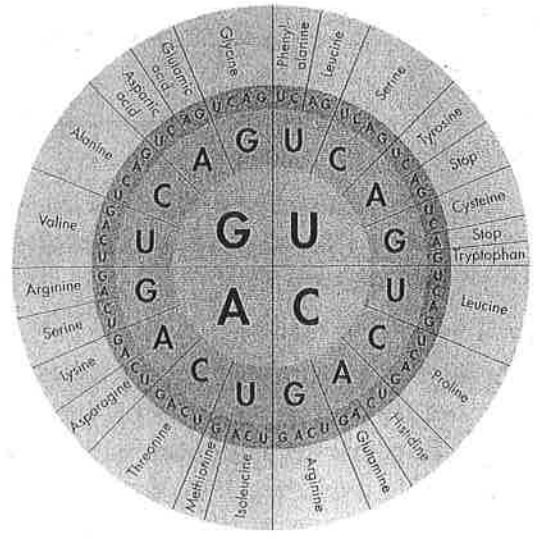


6. What is the role of RNA polymerase? How is it different from the role of DNA polymerase?

Reads the DNA & turns DNA into mRNA
DNA polymerase replicates DNA

For questions 7-12, use the diagram to the right to find the amino acid encoded by each codon.

- 7. GUC: Val
- 8. UGA: STOP
- 9. AUG: MET
- 10. GGA: Gly
- 11. AGA: Arg
- 12. CGC: Arg

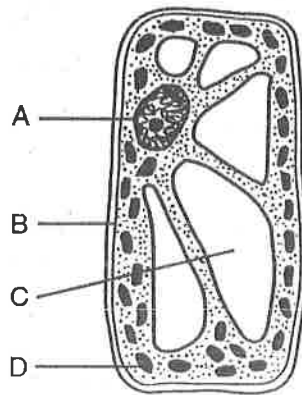


7**Cell Structure and Function****Chapter Test A****Multiple Choice**

Write the letter that best answers the question or completes the statement on the line provided.

- B 1. Who used a compound microscope to see chambers within cork and named them "cells"?
- a. Anton van Leeuwenhoek c. Matthias Schleiden
b. Robert Hooke d. Rudolf Virchow
- D 2. Electron microscopes can reveal details
- a. only in specimens that are still alive.
b. about the different colors of cell structures.
c. of cell structures only once they are stained.
d. 1000 times smaller than those visible in light microscopes.
- C 3. Looking at a cell under a microscope, you note that it is a prokaryote. How do you know?
- a. The cell lacks cytoplasm. c. The cell lacks a nucleus.
b. The cell lacks a cell membrane. d. The cell lacks genetic material.
- A 4. Which of the following is NOT found in the nucleus?
- a. mitochondria c. chromatin
b. nucleolus d. DNA
- B 5. Which organelle breaks down organelles that are no longer useful?
- a. Golgi apparatus c. endoplasmic reticulum
b. lysosome d. mitochondrion

Figure 7-1



- C 6. Which structure in the cell shown in Figure 7-1 above stores materials, such as water, salts, proteins, and carbohydrates?
- a. structure A c. structure C
b. structure B d. structure D
- A 7. Which sequence correctly traces the path of a protein in the cell?
- a. ribosome, endoplasmic reticulum, Golgi apparatus
b. ribosome, endoplasmic reticulum, chloroplast
c. endoplasmic reticulum, lysosome, Golgi apparatus
d. ribosome, Golgi apparatus, endoplasmic reticulum

- C 11. During diffusion, when the concentration of molecules on both sides of a membrane is the same, the molecules will
- move across the membrane to the outside of the cell.
 - stop moving across the membrane.
 - continue to move across the membrane in both directions.
 - move across the membrane to the inside of the cell.
- B 12. The diffusion of water across a selectively permeable membrane is called
- osmotic pressure.
 - osmosis.
 - pinocytosis.
 - active transport.

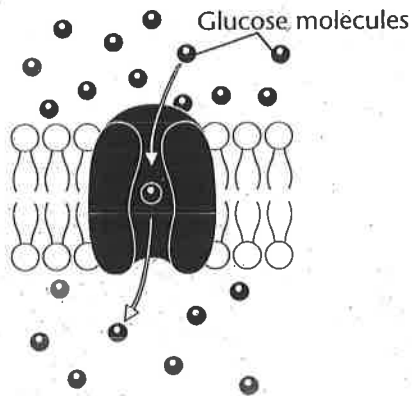


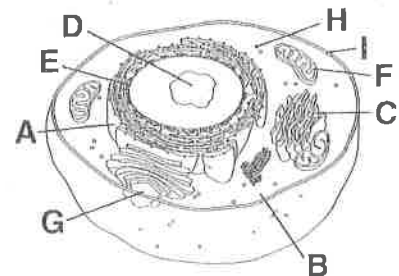
Figure 7-1

- D 13. Which means of particle transport is shown in Figure 7-1 above?
- diffusion
 - osmosis
 - facilitated diffusion
 - active transport
- B 14. Which term describes the relatively constant internal physical conditions of an organism?
- cell specialization
 - homeostasis
 - organ system
 - unicellularity
- C 15. A group of similar cells that perform a particular function is called
- an organ.
 - an organ system.
 - a tissue.
 - a division of labor.

Completion

Complete each statement on the line provided.

16. All cells come from existing Cells
17. The small, dense region indicated in Figure 7-2 by the letter D is called the Nucleolus



8

Photosynthesis

Chapter Test B

Multiple Choice

Write the letter that best answers the question or completes the statement on the line provided.

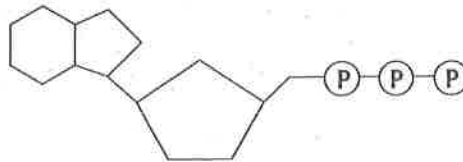
- C 1. What are the three parts of an ATP molecule?
a. adenine, thylakoid, and a phosphate group
b. stroma, grana, and chlorophyll
c. adenine, ribose, and three phosphate groups
d. NADH, NADPH, and FADH₂
- D 2. Energy is released from ATP when
a. a phosphate group is added. c. ATP is exposed to sunlight.
b. adenine bonds to ribose. d. a phosphate group is removed.
- A 3. Organisms, such as plants, that make their own food are called
a. autotrophs. c. thylakoids.
b. heterotrophs. d. pigments.
- A 4. Which of the following organisms is a heterotroph?
a. mushroom c. wheat
b. alga d. sunflower
- D 5. Plants get the energy they need for photosynthesis by absorbing
a. high-energy sugars. c. chlorophyll *b*.
b. chlorophyll *a*. d. energy from the sun.
- C 6. Most plants appear green because chlorophyll
a. absorbs green light. c. does not absorb green light.
b. absorbs violet light. d. does not absorb violet light.
- A 7. The stroma is the region outside the
a. thylakoids. c. plant cells.
b. chloroplasts. d. all of the above
- C 8. Where in the chloroplast is chlorophyll found?
a. in the ATP
b. in the stroma
c. in the thylakoid membrane
d. in the thylakoid space
- A 9. What is the function of NADP⁺ in photosynthesis?
a. electron carrier
b. high-energy sugar
c. photosystem
d. pigment
- D 10. Photosynthesis uses sunlight to convert water and carbon dioxide into
a. oxygen and carbon.
b. high-energy sugars and proteins.
c. ATP and oxygen.
d. oxygen and high-energy sugars.

- C 11. Where do the light-dependent reactions take place?
 a. in the stroma of the chloroplast
 b. within the mitochondria membranes
 c. within the thylakoid membranes
 d. in the outer membrane of the chloroplasts
- B 12. What are the products of the light-dependent reactions?
 a. oxygen gas and glucose
 b. ATP, NADPH, and oxygen gas
 c. ATP, carbon dioxide gas, and NADPH
 d. carbon dioxide gas, oxygen gas, and NADPH
- B 13. Where are photosystems I and II found?
 a. in the stroma
 b. in the thylakoid membrane
 c. in the Calvin cycle
 d. in the cell membrane
- C 14. Which of the following activities happens within the stroma?
 a. Photosystem I absorbs light.
 b. ATP synthase produces ATP.
 c. The Calvin cycle produces sugars.
 d. Electrons move through the electron transport chain.
- A 15. The Calvin cycle is another name for the
 a. light-independent reactions.
 b. light-dependent reactions.
 c. photosynthesis reaction.
 d. electron transport chain.

Modified True/False

Indicate whether the statement is true or false. If false, change the underlined word or phrase to make the statement true.

- T 16. The substance represented below is called ATP.



- T 17. Plants gather energy with light-absorbing molecules called pigments.
- F 18. During the light-dependent reactions, plants use the energy in ATP and NADPH to build high-energy sugars. In
- F 19. ATP synthase changes ADP to ATP when light energy passes through it. H+

9

Cellular Respiration and Fermentation**Chapter Test B****Multiple Choice**

Write the letter that best answers the question or completes the statement on the line provided.

1. How do organisms get the energy they need?
a. by burning food molecules and releasing their energy as heat
b. by breathing oxygen into the lungs and combining it with carbon dioxide
c. by breaking down food molecules gradually and capturing their chemical energy
d. by using the sun's energy to break down food molecules and form chemicals
- C 2. Which of the following is the correct sequence of events in cellular respiration?
a. glycolysis → fermentation → Krebs cycle
b. Krebs cycle → electron transport → glycolysis
c. glycolysis → Krebs cycle → electron transport
d. Krebs cycle → glycolysis → electron transport
- B 3. Which of these is a product of cellular respiration?
a. oxygen
b. water
c. glucose
d. lactic acid
- B 4. Which process does NOT release energy from glucose?
a. glycolysis
b. photosynthesis
c. fermentation
d. cellular respiration
- D 5. Unlike photosynthesis, cellular respiration occurs in
a. animal cells only.
b. plant cells only.
c. prokaryotic cells only.
d. all eukaryotic cells.
- D 6. The starting molecule for glycolysis is
a. ADP.
b. pyruvic acid.
c. citric acid.
d. glucose.
- D 7. Which of the following is NOT a product of glycolysis?
a. NADH
b. pyruvic acid
c. ATP
d. glucose
- B 8. The Krebs cycle does NOT occur if
a. oxygen is present.
b. oxygen is not present.
c. glycolysis occurs.
d. carbon dioxide is present.
- C 9. The Krebs cycle produces
a. oxygen.
b. lactic acid.
c. carbon dioxide.
d. glucose.
- A 10. In eukaryotes, electron transport occurs in the
a. inner mitochondrial membrane.
b. nucleus.
c. cell membrane.
d. cytoplasm.

- B 11. High-energy electrons that move down the electron transport chain ultimately provide the energy needed to
- transport water molecules across the membrane.
 - convert ADP molecules into ATP molecules.
 - convert carbon dioxide into water molecules.
 - break down glucose into pyruvic acid molecules.
- D 12. Cellular respiration uses 1 molecule of glucose to produce approximately
- 2 ATP molecules.
 - 4 ATP molecules.
 - 32 ATP molecules.
 - 36 ATP molecules.
- C 13. The air bubbles and spongy texture of bread are due to which process?
- lactic acid fermentation
 - glycolysis
 - alcoholic fermentation
 - the Krebs cycle
- D 14. The conversion of pyruvic acid into lactic acid requires
- alcohol.
 - oxygen.
 - ATP.
 - NADH.
- B 15. All of the following are sources of energy for humans during exercise EXCEPT
- stored ATP.
 - alcoholic fermentation.
 - lactic acid fermentation.
 - cellular respiration.

Modified True/False

Indicate whether the statement is true or false. If false, change the underlined word or phrase to make the statement true.

- F 16. Cellular respiration releases energy by breaking down glucose in the presence of carbon dioxide. O₂
- F 17. The reactants of photosynthesis are the same as the reactants of cellular respiration. PRODUCTS
- T 18. The Krebs cycle releases energy in the form of ATP.
- T 19. Without the Krebs cycle, the electron transport chain cannot function.
- F 20. The first few seconds of intense exercise use up the cell's stores of fat.
ATP

Completion

Complete each statement on the line provided.

21. The original source of energy for all organisms in an ocean food chain is the SUN.
22. Glycolysis alone nets only 2 molecules of ATP from each glucose molecule.

13 RNA and Protein Synthesis

Chapter Test B

Multiple Choice

Write the letter that best answers the question or completes the statement on the line provided.

- B 1. Unlike DNA, RNA contains
- a. adenine.
 - b. uracil.
 - c. phosphate groups.
 - d. thymine.
- C 2. Which type of RNA brings the information in the genetic code from the nucleus to other parts of the cell?
- a. rRNA
 - b. tRNA
 - c. mRNA
 - d. RNA polymerase
- C 3. From which molecules are mRNA molecules transcribed?
- a. tRNA
 - b. rRNA
 - c. DNA
 - d. proteins
- C 4. How many nucleotides are needed to specify three amino acids?
- a. 3
 - b. 6
 - c. 9
 - d. 12
- B 5. What happens during translation?
- a. Messenger RNA is made from a DNA code.
 - b. The cell uses a messenger RNA code to make proteins.
 - c. Transfer RNA is made from a messenger RNA code.
 - d. Copies of DNA molecules are made.
- C 6. Which is the correct sequence of the transfer of information in most organisms?
- a. protein to DNA to RNA
 - b. RNA to DNA to protein
 - c. DNA to RNA to protein
 - d. RNA to protein to DNA
- A 7. The genetic code is always read
- a. 3 bases at a time in the same direction.
 - b. 4 bases at a time in the same direction.
 - c. 3 bases at a time and the direction varies.
 - d. 4 bases at a time and the direction varies.
- E 8. A mutation that involves one or a few nucleotides is called
- a. a mutagen.
 - b. an inversion.
 - c. a point mutation.
 - d. a translocation.

