

Aim 19: Cellular Respiration

1. During the process of cellular respiration, energy is released from

- A) carbon dioxide B) oxygen atoms
C) water molecules D) chemical bonds

2. The energy used to obtain, transfer, and transport materials within an organism comes directly from

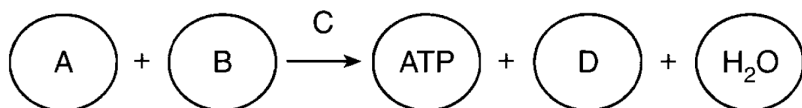
- A) ATP B) DNA C) sunlight D) starch

3. A student prepared a test tube containing yeast, glucose, and water. After 24 hours, the test tube was analyzed for the presence of several substances.

What substance would the student expect to find if respiration occurred in the test tube?

- A) a hormone B) starch
C) nitrogen D) carbon dioxide

4. A biological process that occurs in both plants and animals is shown below.



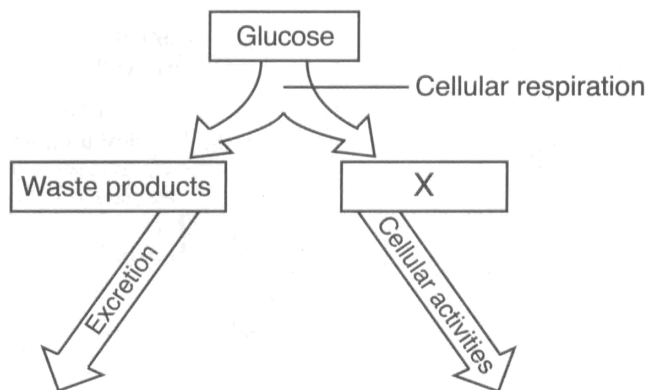
Which row in the chart below identifies the lettered substances in this process?

Row	A	B	C	D
(1)	O ₂	CO ₂	glucose	enzymes
(2)	glucose	O ₂	enzymes	CO ₂
(3)	enzymes	O ₂	CO ₂	glucose
(4)	glucose	CO ₂	enzymes	O ₂

- A) 1 B) 2 C) 3 D) 4

Aim 19: Cellular Respiration

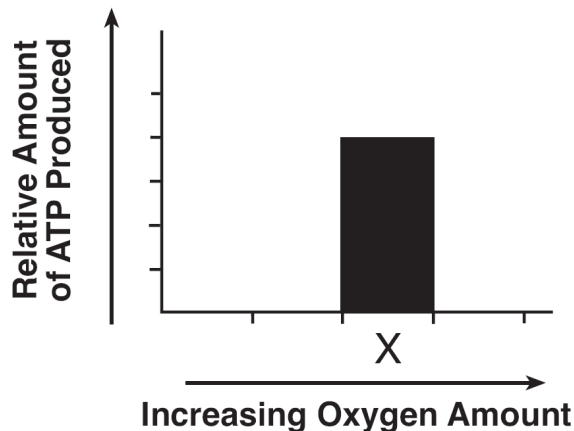
5. The diagram below represents a biochemical process.



Which molecule is represented by X?

- A) DNA B) starch C) protein D) ATP

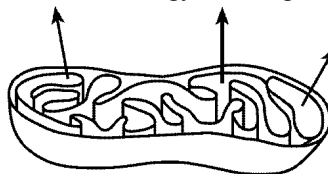
6. A student studied how the amount of oxygen affects ATP production in muscle cells. The data for amount X are shown in the graph below.



If the student supplies the muscle cells with *less* oxygen in a second trial of the investigation, a bar placed on the graph to represent the results of this trial would most likely be

- A) shorter than bar X and placed to the left of bar X
 B) shorter than bar X and placed to the right of bar X
 C) taller than bar X and placed to the left of bar X
 D) taller than bar X and placed to the right of bar X

7. The diagram below represents a cell organelle involved in the transfer of energy from organic compounds.



The arrows in the diagram could represent the release of

- A) ATP from a chloroplast carrying out photosynthesis
 B) oxygen from a mitochondrion carrying out photosynthesis
 C) glucose from a chloroplast carrying out respiration
 D) carbon dioxide from a mitochondrion carrying out respiration

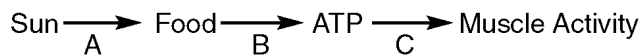
8. The production of energy-rich ATP molecules is the direct result of

- A) recycling light energy to be used in the process of photosynthesis
 B) releasing the stored energy of organic compounds by the process of respiration
 C) breaking down starch by the process of digestion
 D) copying coded information during the process of protein synthesis

9. Why would organisms break the bonds of organic compounds?

- A) in order to use the smaller molecules to plug the gaps in the cell membrane to slow diffusion
 B) to use the energy obtained to digest molecules produced by respiration that uses oxygen
 C) for energy or to reassemble the resulting materials to form different compounds
 D) to excrete smaller amounts of solid waste materials during vigorous exercise

10. The flow of energy through an ecosystem involves many energy transfers. The diagram below summarizes the transfer of energy that eventually powers muscle activity.

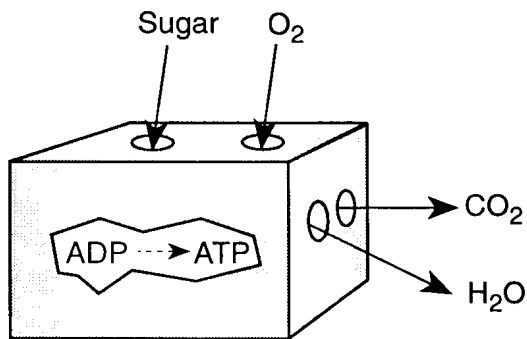


What is the process of cellular respiration represented by?

- A) arrow A, only B) arrow B, only
 C) arrow C, only D) arrows A, B, and C

Aim 19: Cellular Respiration

11. Which phrase best describes cellular respiration, a process that occurs continuously in the cells of organisms?
- A) removal of oxygen from the cells of an organism
 - B) conversion of light energy into the chemical bond energy of organic molecules
 - C) transport of materials within cells and throughout the bodies of multicellular organisms
 - D) changing of stored chemical energy in food molecules to a form usable by organisms
12. The energy found in ATP molecules synthesized in animal cells comes directly from
- A) sunlight
 - B) organic molecules
 - C) minerals
 - D) inorganic molecules
13. The diagram below represents some events that take place in a plant cell.



In which organelle would these events most likely occur?

- A) mitochondrion
 - B) chloroplast
 - C) lysosome
 - D) centriole
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Aim 19: Cellular Respiration

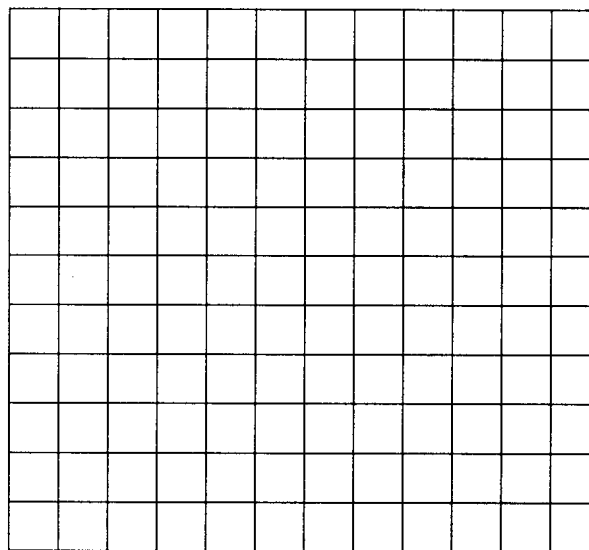
Base your answers to questions 14 through 17 on the information and data table below and on your knowledge of biology.

During a study of a colony of yeast cells, a student used a microscope to determine the number of yeast cells present at various times. The results are summarized in the data table below.

Data Table

Time (hours)	Number of Yeast Cells
0	5
1	10
2	18
3	45
4	30
5	8

Number of Yeast Cells



Time (hr)

- Approximately how many yeast cells were present after 2.5 hours?
- Using one or more complete sentences, state one possible reason for the change in the number of yeast cells after the third hour.
- Plot the data on the grid. Surround each point with a small circle and connect the points.
- Mark an appropriate scale on each labeled axis.

Base your answers to questions 18 and 19 on the information below.

Animals eat and digest food to obtain the energy available for life activities. Discuss energy use in animals.

In your discussion, be sure to:

- Identify the organelle where energy from nutrients is released.
 - Identify the type of protein molecules used to digest food.
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Aim 19: Cellular Respiration

20. Base your answer to the following question on the word equations below and on your knowledge of biology. The equations represent two biochemical processes that occur in living organisms. The letter X represents a molecule produced from process 1.

Process 1: oxygen + glucose \rightarrow carbon dioxide + water + X

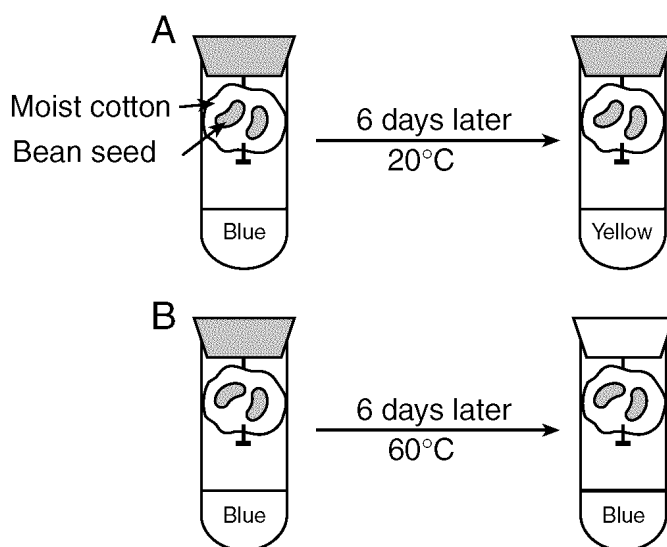
Process 2: carbon dioxide + water \rightarrow oxygen + glucose

Identify the molecule represented by letter X in process 1.

21. State *one* reason that most foods must be digested before they can enter a cell.

Base your answers to questions 22 and 23 on the information and diagram below and on your knowledge of biology.

Two test tubes, A and B , were set up as shown in the diagram below. Bromthymol blue, which turns from blue to yellow in the presence of carbon dioxide, was added to the water at the bottom of each tube before the tubes were sealed. The tubes were maintained at the temperatures shown for six days. (Average room temperature is 20°C .)



22. Explain how the temperature difference could lead to the different results in tubes A and B after six days.
23. Identify the life process responsible for the change in tube A .