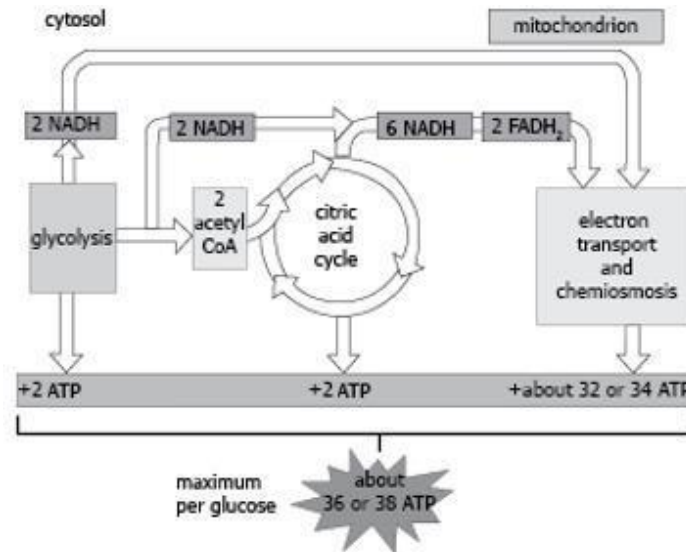


## Cellular Energy Test

This is a cumulative test. That means that it includes questions from every unit of study up to this point. Please take your time and select the best answer.

1. (B.3 A.4) The model shows different processes involved in cellular respiration.



Which process(es) is (are) more efficient in generating energy molecules than the others?

- Glycolysis
- Citric acid cycle
- Glycolysis and citric acid cycle
- Electron transport chain

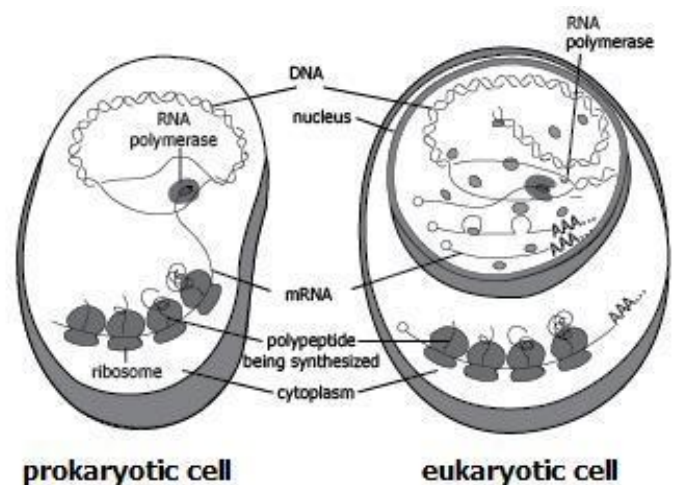
2. (B.3A.1) Energy is released from ATP when...

- A phosphate bond is broken
- A phosphate group is added
- A bond is broken between a base and a sugar
- A bond is formed between two phosphate groups

3. (B.2 B.2) The image shows protein synthesis in a prokaryotic and eukaryotic cell.

How do the two cells differ?

- Proteins are produced in the nucleus of a prokaryotic cell.
- Proteins are produced in the nucleus of a eukaryotic cell.
- Genetic material is contained within the nucleus of a prokaryotic cell.
- Genetic material is contained within the nucleus of a eukaryotic cell.

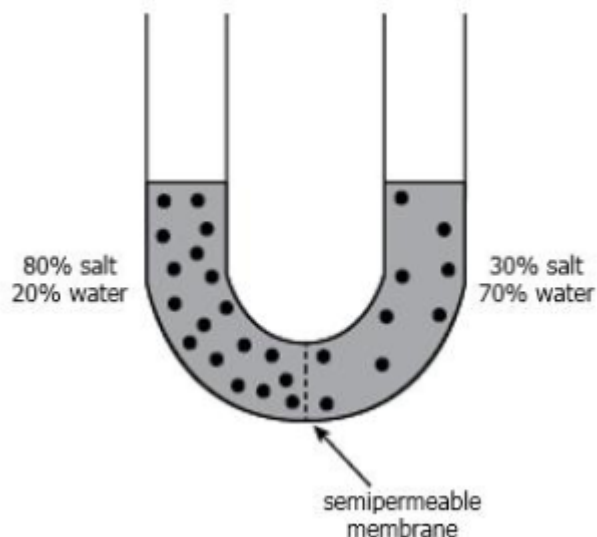


4. (B.2 D.3) Proteins that regulate the cell cycle are inactive when the cell is not dividing, and they are turned on when the cell begins the cell cycle. What would happen if these proteins remained turned on indefinitely?
- Cells would stop dividing and die.
  - Cells would divide uncontrollably and could become cancerous.
  - Cells would increase enormously in size and explode.
  - Cells would divide without replicating their DNA.

- 
5. (B.2A.1) Where is ATP produced?
- Only in autotrophs
  - Only in heterotrophs
  - In both plant and animal cells only
  - In all cells

- 
6. (B.2C.1) A student places solutions of differing salt concentrations on either side of a semipermeable membrane in a U-shaped tube, as shown in the model. What will the student most likely observe after several hours if the membrane is permeable to only water?

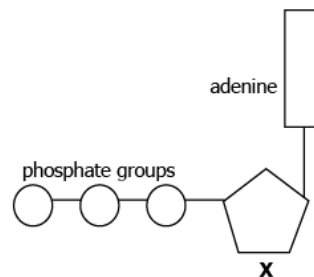
- Water will diffuse from 30% salt solution to the 80% salt solution to maintain equilibrium.
- Water will diffuse from the 80% salt solution to the 30% salt solution to maintain equilibrium.
- Salt will diffuse from the 30% salt solution to the 80% salt solution to maintain equilibrium.
- Salt will diffuse from the 80% salt solution to the 30% salt solution to maintain equilibrium.



- 
7. (B.2A.1) The diagram shows the structure of an ATP molecule.

What molecule is represented by the letter X in the structure?

- Amino acid
- Fatty acid
- Ribose
- Sulfur

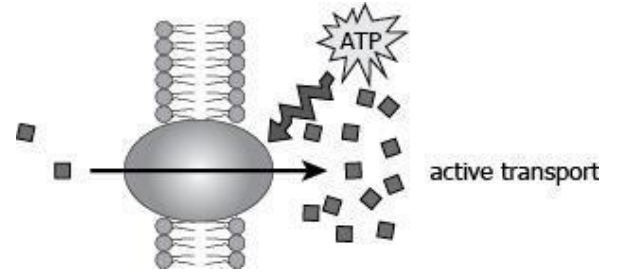


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8. (B.3A.4) Which statement best describes photosynthesis and respiration ?
- Autotrophs carry out photosynthesis, while autotrophs and heterotrophs carry out respiration.
  - Autotrophs and heterotrophs both carry out photosynthesis and then respiration.
  - In autotrophs, photosynthesis requires oxygen, and respiration requires carbon dioxide.
  - Only autotrophs carry out photosynthesis, while only heterotrophs carry out respiration.

9. (B.2 C.1) The model shows the active transport of molecules that are necessary for the maintenance of the internal cell environment.

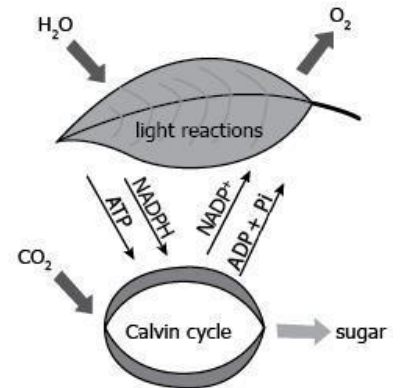
Based on the model, what can be concluded about active transport?

- Energy is necessary to produce life-saving molecules.
- Energy is necessary to maintain the internal cell environment.
- Active transport moves molecules along the concentration gradient.
- Active transport always moves molecules from the external to the internal cell environment.



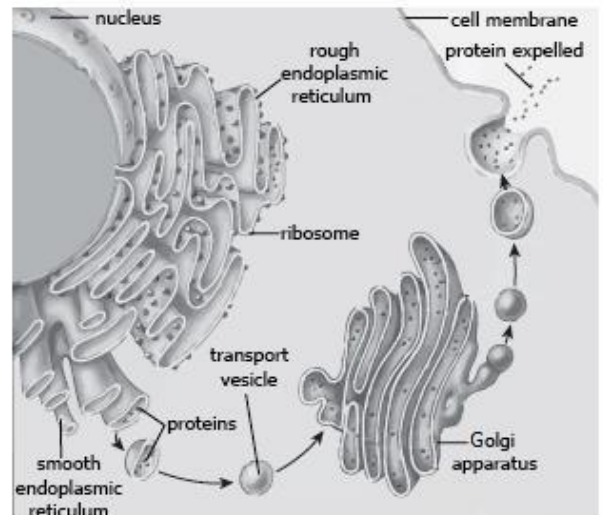
10. (B.3 A.2) A student creates a model of photosynthesis. What is missing from this model?

- Glycolysis reactions
- Light-dependent reactions
- Source of products
- A light source



11. (B.2 B.1) The model shows the transport of proteins inside and outside the cell. Based on the model, what is the role of the endoplasmic reticulum?

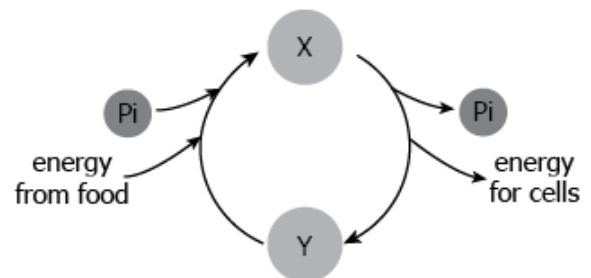
- It is the site of protein synthesis.
- It is the site of protein modification.
- It digests unused proteins.
- It transports proteins inside the cell.



12. (B.3A.1) The diagram shows a process taking place between molecules X and Y that provide energy to cells.

What are molecules X and Y?

- X: glucose; Y: lactose
- X: amino acid; Y: fatty acid
- X: DNA; Y: RNA
- X: ATP; Y: ADP

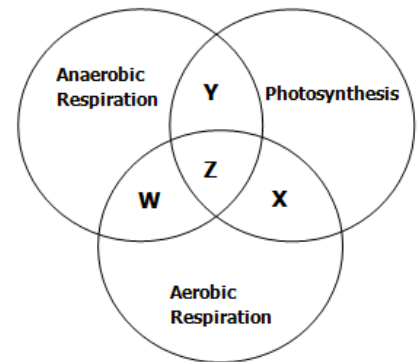


13. (B.2 A.1) Why do people training for athletic events consume lots of carbohydrates in their diets?
- Carbohydrates help transport fluids in the body.
  - Carbohydrates help control the movement of muscles.
  - Carbohydrates act as an immediate source of energy.
  - Carbohydrates can be converted to proteins and fats by the body.
- 

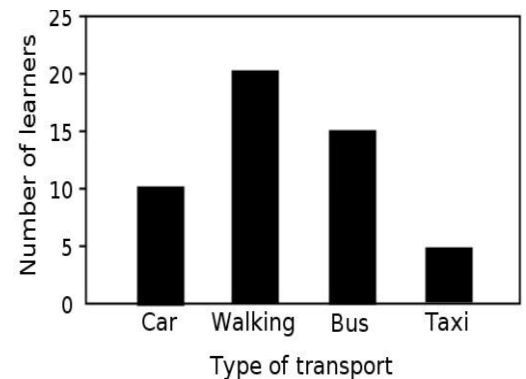
14. (B.3A.4) Which would most likely occur if the mitochondria were damaged in an animal cell?
- The cell would be unable to produce proteins.
  - The cell would be unable to remove waste.
  - The cell would be unable to produce ATP for energy.
  - The cell would be unable to reproduce without DNA.
- 

15. (B.3A.4) Refer to the Venn diagram to answer the question.  
What is the best descriptor for the area labeled Y in the diagram?

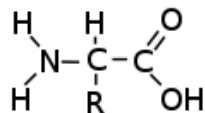
- Uses light
- Occurs in animals
- Creates lactic acid
- Does not require oxygen



16. (B.1A.3) According to the graph to the right, what is the dependent variable?
- The number of learners
  - The car
  - The walking and the bus
  - The type of transport

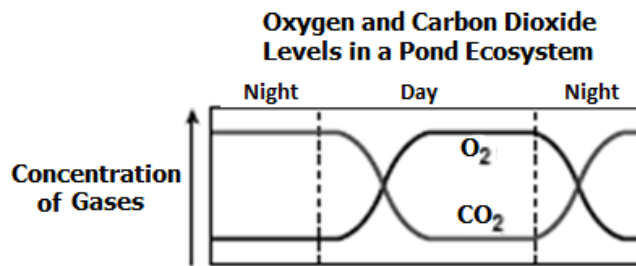


17. (B.2 A.1) Biological polymers are made up of much smaller monomers.



- If several of these monomers were linked together, what type of polymer would be created?
- DNA
  - Polysaccharide
  - Protein
  - RNA

18. (B.2A.2) The diagram shows how gas concentration in a pond change over a 24-hour period.

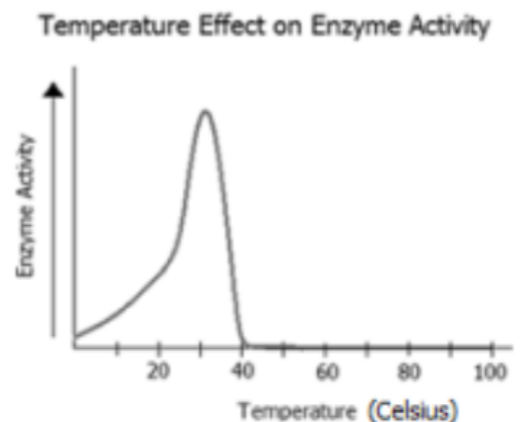


Which hypothesis is most likely supported by the data?

- a. The concentration of O<sub>2</sub> will increase during the day as a result of decreased pond temperatures.
- b. The concentration of O<sub>2</sub> will decrease during the night as a result of decreased photosynthesis.
- c. The concentration of CO<sub>2</sub> will increase during the night as a result of decreased cellular respiration.
- d. The concentration of CO<sub>2</sub> will decrease during the day as a result of decreased fermentation.

19. (B.2 A.2) A scientist wants to test the effect of temperature on human enzyme action. The scientist sets up an experiment to measure the rate of enzyme activity at 10 degree intervals from 0°C to 100°C. The graph shows the results.

- a. The enzyme begins to work at 10°C.
- b. The enzyme ceases to function at 60°C.
- c. The highest activity occurs between 20°C and 40°C
- d. The optimum temperature for enzyme activity is 30°C.



20. (B.3A.4) Three statements were written about a specific cellular process.

1. It occurs at all times.
2. It takes place in all active cells.
3. It releases carbon dioxide and water.

Which additional statement could be added to the list?

- a. It requires light as an energy source.
- b. It releases energy in the form of ATP.
- c. It is required for the production of carbohydrates.
- d. It causes an increase in the mass of plants.

21. (B.2 A.1) What determines the caloric value of organic molecules?

- a. The amounts stored in the body
- b. How they are absorbed by the body
- c. The number of monosaccharides present
- d. The structure and number of carbon-hydrogen bonds

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22. (B.3A.2) Organisms need energy for life processes. Which chemical equation represents the reactions that take place in the chloroplasts to transform light energy into chemical energy?

- a.  $6O_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6CO_2$
- b.  $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$
- c.  $6O_2 + C_6H_{12}O_6 \rightarrow 6H_2O + 6CO_2$
- d.  $6CO_2 + C_6H_{12}O_6 \rightarrow 6H_2O + 6O_2$

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23. (B.3A.2) A student conducts an experiment to study the rate of photosynthesis in the hydrilla plant. The number of oxygen bubbles produced indicates the rate of photosynthesis. The table shows the experimental results.

Beaker Containing Hydrilla Plant	Length of Hydrilla Plant (cm)	Concentration of Carbon Dioxide (%)	Number of Oxygen Bubbles Produced per Minute
1	10	0.0	0
2	10	1.0	20
3	10	2.0	45
4	10	3.0	55
5	10	4.0	55

Which conclusion is supported by the results of the experiment?

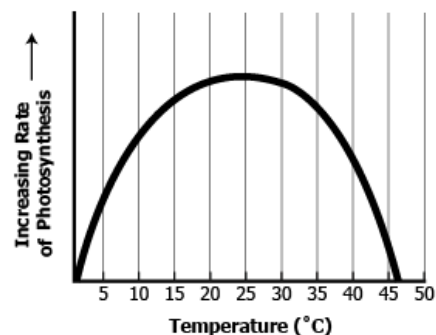
- a. The rate of photosynthesis in a hydrilla plant is inversely proportional to the length of the plant.
- b. The rate of photosynthesis in a hydrilla plant increases constantly with an increase in the concentration of carbon dioxide.
- c. The rate of photosynthesis in a hydrilla plant is the greatest in a plant with a length that is 10 cm with a 4% carbon dioxide concentration.
- d. The rate of photosynthesis in a hydrilla plant increases until carbon dioxide concentrations reach 3% or higher when the rate becomes constant.

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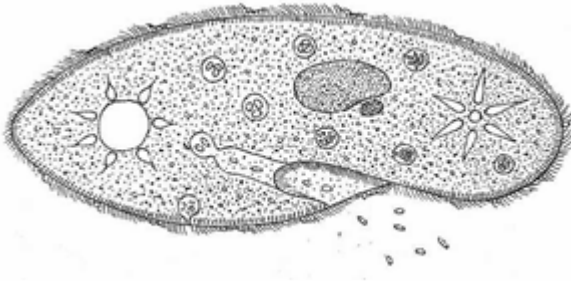
24. (B.3A.2) The graph shows the relationship of photosynthesis with temperature.

At what temperature is the rate of photosynthesis the highest?

- a. 10°C
- b. 15°C
- c. 25°C
- d. 35°C



25. (B.2C.2) The organism shown in the diagram normally lives in small ponds and streams that contain water with small amounts of salts and other ions.



What would happen to the organism if it was moved to an environment containing distilled (pure) water?

- a. Salt ions would move out of the organism due to osmosis
- b. Salt ions would move into the organism due to osmosis
- c. Water molecules would move into the organism due to osmosis
- d. Water molecules would move out of the organism due to osmosis