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HW 2.3: Photosynthesis & Cellular Respiration

Photosynthesis HSA Questions

The equation for photosynthesis is…

Read the following and answer the questions below USING the RUBIES Strategy! You will NOT receive credit for only circling answers. (1 point for RUBIES, 1 point for choosing an answer, 1 point for the correct answer)

RUBIES Test-Taking Strategy:

Read the question first

Underline key words in the question

"What is the question asking about?"
"Do I need more information to solve this problem?"
"Can I find the information in a table, graph or image?"

Bracket (or highlight) important information in the passage, image, or graph.

"What information in the passage relates to the key words I underlined in the question?"

Identify the key concept

"What unit is this question testing?
"What topic/idea are they asking about?"

Eliminate at least 2 wrong answer choices

"What answers don't relate to the key words, information, unit, or topic I identified?"

Select the correct answer

In an ocean environment, marine life is most abundant in the euphotic zone. This zone extends from the surface waters to a depth of 200 meters, the deepest depth that sunlight can reach. It is in this range that phytoplankton capture energy from the sun. Although they are microscopic, phytoplankton are the foundation that supports the marine food web.

1. Through which process do phytoplankton use energy from the sun to make their food?

A. respiration

B. chemosynthesis

C. photosynthesis

D. evaporation

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2. Which of the following pairs of materials are required for a cell to carry on respiration?

A. glucose and oxygen

B. water and carbon dioxide

C. water and oxygen

D. glucose and carbon dioxide

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3. The water quality of the Chesapeake Bay is measured by the Chesapeake Bay Water Quality Monitoring Program. Scientists measure the salinity, temperature, pH, and oxygen levels to help determine the health of the Bay. Healthy water also contains appropriate amounts of nutrients. Monitoring water quality helps communities make decisions about the Bay. Measuring oxygen levels of the Bay provides scientists with information about which process?

A. mitosis

B. meiosis

C. chemosynthesis

D. photosynthesis

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4. Some bacteria live in habitats without light. They produce their own food using inorganic substances from the environment. Which of these terms best describes this process?

A. cellular respiration

B. binary fission

C. photosynthesis

D. chemosynthesis

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5. Which of these statements about photosynthesis and respiration is true?

A. both processes produce food

B. both processes release energy from food

C. photosynthesis produces oxygen; respiration does not

D. photosynthesis produces carbon dioxide; respiration does not

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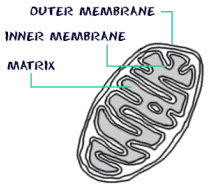
Mitochondria - the Powerhouse of the Cell

Mitochondria are known as the powerhouses of the cell. They are **organelles** that take in nutrients (like carbohydrates) from food, break them down, and produce energy for the cell. The process of changing the chemical energy from food into the cell's energy is known as ***cellular respiration*****.** Most of the chemical reactions involved in cellular respiration happen in the mitochondria.



1. Why are mitochondria considered the "powerhouse" or "battery" of the cell?

2. What process happens in the mitochondria?

3. What is the purpose of the process in #2?

Mitochondria are very small organelles. You might find cells with several thousand mitochondria. The number depends on what the cell needs to do. For example, if the purpose of the cell is to transmit nerve impulses, there will be fewer mitochondria than in a muscle cell that needs a lot of energy. If the cell feels it is not getting enough energy to survive, more mitochondria can be created. Sometimes they can even grow, move, and combine with other mitochondria, depending on the cell's needs.

4. Would you expect your heart cell or your toe cell to need more mitochondria? Why?

5. What can a cell do if it needs more energy?

Cellular Respiration

Organisms, such as plants, can trap the energy in sunlight and store it in the chemical bonds of carbohydrate molecules through photosynthesis. The principal carbohydrate formed through photosynthesis is ***glucose***. Other types of organisms, such as animals, fungi, protozoa, and a large portion of the bacteria, are unable to perform this process. Therefore, these organisms must rely on the carbohydrates formed in plants to obtain the energy necessary for the processes that they undergo. They get this energy through eating, but they can't use glucose directly. They need to convert it to another type of energy called ATP. Animals and other organisms change the energy available in carbohydrates to ATP through the process of ***cellular respiration***.

6. Some organisms like plants perform photosynthesis to produce energy. Other organisms cannot do photosynthesis. What can these other organisms do in order to obtain the energy they need?

7. True or False: After you eat a meal, your body uses glucose directly to help you survive.

8. What is ATP?

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During respiration, cells take the carbohydrates into their mitochondria, and through a complex series of chemical processes, they break down the carbohydrates and release the energy in the form of ATP. The ATP can then be used for processes in the cells that require energy, just like a battery that powers a mechanical device. During the process of cellular respiration, carbon dioxide is given off.

9. What happens to carbohydrates during cellular respiration?

10. What else is produced in cellular respiration besides ATP?

11. Write the overall chemical reaction of cellular respiration in the space below:

12) A summer camp was built near a lake in the mountains. The campers used the lake for swimming, fishing, and boating. Which of these fish cell structures would be most directly affected by a change in the oxygen level of the lake?

a. Mitochondrion
b. Chloroplast
c. Nucleus
d. Ribosome

13) The process during which energy is released from digested foods is called:

a) cellular respiration
b) chemical digestion
c) photosynthesis
d) excretion

14) Energy that's used in cells is stored in the form of:

a) chemical energy
b) physical energy
c) heat energy
d) mechanical energy

15) The energy carrier molecule that organisms actually use as energy is called:

a) glucose
b) fructose
c) ATP
d) light

16) In which process do organisms transfer the energy in carbohydrates to ATP molecules?

a) excretion
b) cellular respiration
c) photosynthesis
d) chemosynthesis

17) In cellular respiration, the energy released is used to:

a) synthesize ATP
b) control diffusion
c) synthesize more glucose
d) produce oxygen

18) Living organisms must be able to obtain materials, change materials into new forms, and remove poisons. Many of these activities directly require:

a) energy from ATP
b) carbohydrates in the nucleus
c) DNA in the cell membrane
d) water and pH