

Cellular Respiration Task Cards

Directions: Complete the question or task found on each of the cards. Record your answers on the answer sheet or on your notebook paper as directed by your teacher.

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List two reasons why food is important to living organisms.

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Name the principal molecule that stores and releases energy as needed to the cells of a living organism.

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ATP and ADP are initials for what words?

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Describe two basic differences between ADP and ATP.



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List three basic components of an ATP molecule.



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What is the role of ATP in living cells?



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How does ADP become ATP?



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What happens when a phosphate molecule is removed from ATP?



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List three cellular processes that require the energy from ATP.



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Fill in the blanks.

Energy flows into an ecosystem in the form of ___a___ and leaves as ___b___.



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Describe the relationship that exists between photosynthesis and cellular respiration.



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Write the definition of cellular respiration.



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Which living organisms carry out cellular respiration?



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Write a chemical equation that gives the reactants and products of cellular respiration.



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In order to carry out cellular respiration, eukaryotic organisms require what cell organelle?



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Do prokaryotic organisms carry out cellular respiration? If so, how?



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Distinguish between aerobic and anaerobic respiration.



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List the three main stages of cellular respiration. Indicate if the stage is aerobic or anaerobic.



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What stage of cellular respiration occurs in the cytoplasm of the cell?



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What stages of cellular respiration occur in the mitochondria?



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Describe the process of glycolysis in one sentence.



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Even though respiration is an energy-releasing process, a small amount of energy must be invested to get the reactions going. During glycolysis, the energy of ___a___ ATP is consumed, but by the end of the process ___b___ ATP are produced.



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What is NAD^+ and what is its role in cellular respiration?



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What molecule is formed when NAD^+ accepts a pair of high-energy electrons?



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How many molecules of NADH are produced during glycolysis?



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As molecules of NADH are produced, they will be delivered to what stage of respiration?



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List three end products of glycolysis.



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What are two possible paths for the pyruvic acid molecules produced in glycolysis?



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What is the advantage of glycolysis?



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What is a disadvantage of glycolysis?

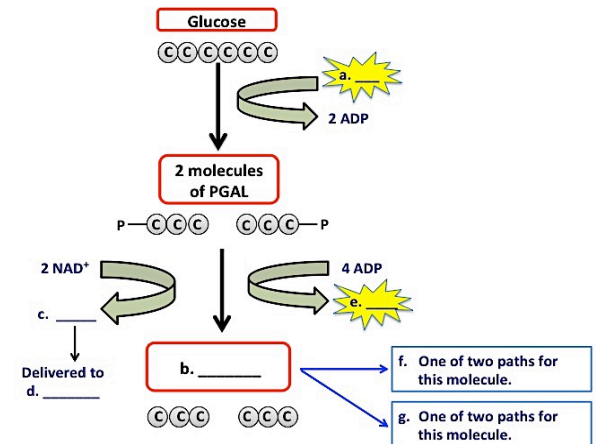


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Summary of glycolysis. Fill in the missing parts (letters a – g) in the diagram below.



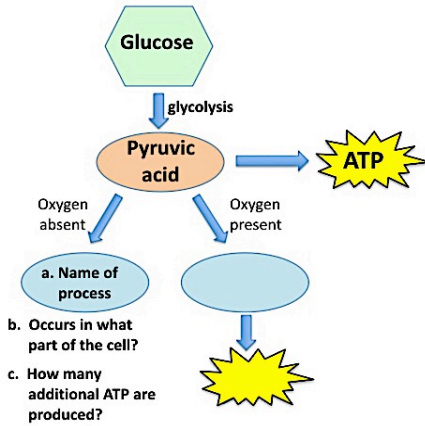


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What happens to the pyruvic acid that is produced during glycolysis if NO oxygen is available to the cell? Fill in the missing parts (letters a – c) in the diagram below.

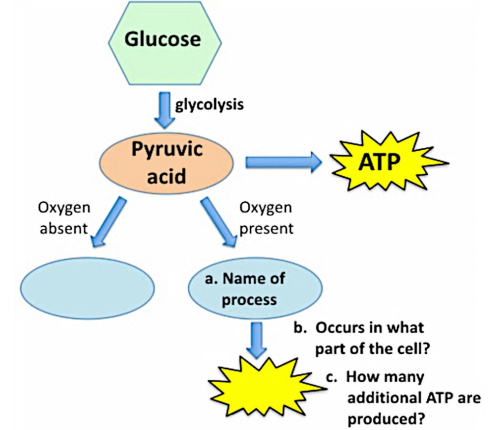


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What happens to the pyruvic acid that is produced during glycolysis if oxygen is available to the cell? Fill in the missing parts (letters a – c) in the diagram below.



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Describe the Krebs cycle in one sentence.



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Describe the electron transport chain in one sentence.

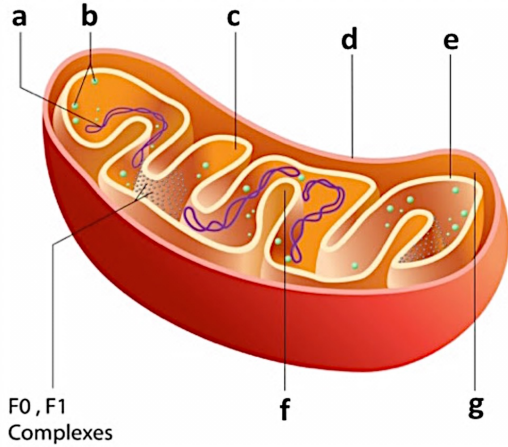


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Label the structures of a mitochondrion.



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What name is given to the space inside the mitochondria that contains enzymes, DNA, and ribosomes?



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The inner membrane of the mitochondria has many loops and folds. What name is given to these loops and folds, and what is their purpose?



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What two stages of aerobic respiration occur inside the mitochondria? Where in the mitochondria does each take place?



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The Krebs cycle begins when _____ produced by glycolysis enters the mitochondrion.



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The Krebs cycle begins with a series of reactions that are sometimes referred to as the bridge reactions. In this set of reactions, pyruvic acid is converted into what compound?



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For each pyruvic acid converted to acetyl-CoA:

- How many molecules of NADH are formed? What happens to them?
- How many molecules of carbon dioxide are formed? What happens to them?



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The Krebs cycle begins with a series of reactions that are sometimes referred to as the bridge reactions.

Explain why this name (bridge reaction) is used.

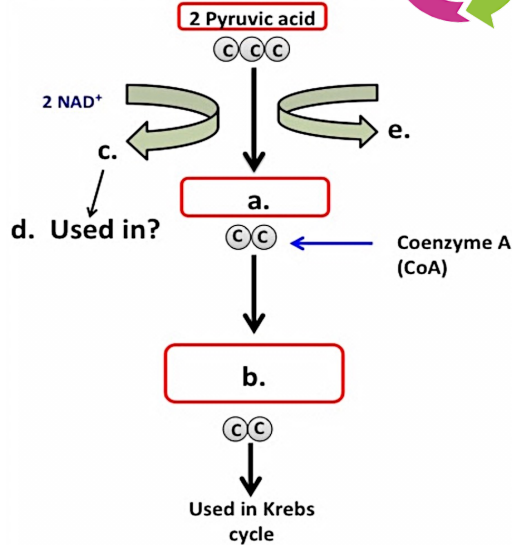


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Summary of the bridge reaction. Fill in the missing parts (letters a – e) in the diagram.



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List three products that are continually produced in the Krebs cycle.



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What are NAD⁺ and FAD, and what is their role in the Krebs cycle?



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What is the total amount of each of the following produced during the Krebs cycle per molecule of pyruvic acid?

- a) CO₂
- b) ATP
- c) NADH
- d) FADH₂



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What is the total amount of each of the following produced during the Krebs cycle per molecule of glucose?

- a) CO_2
- b) ATP
- c) NADH
- d) FADH_2



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What happens to the carbon dioxide that is produced during the Krebs cycle?



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What happens to the ATP that is produced during the Krebs cycle?



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What happens to the NADH and FADH_2 molecules that are produced during the Krebs cycle?



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The high-energy electrons from NADH and FADH₂ are passed along the electron transport chain. As they are passed from one protein to the next, they release energy. What is this energy used for?



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What happens to the hydrogen electrons at the end of the electron transport chain?



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Explain how the electron transport chain produces ATP.



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Recap of Electron Transport: Fill in the blanks in the paragraph below to summarize the events of the electron transport chain.

This system couples the movement of high-energy ___a___ with the production of ___b___. As the high-energy electrons move down the electron transport chain, they release ___c___. This energy is used to move ___d___ across the membrane. These ions then rush back across the membrane through proteins called ___e___ to generate enormous amounts of ___f___.



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The Totals: How many ATP are produced in each of the following stages?

- a) Glycolysis?
- b) Krebs cycle?
- c) Electron transport chain?



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The Totals: How many NADH are produced in each of the following stages?

- a) Glycolysis?
- b) The bridge reaction?
- b) Krebs cycle?



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The Totals: How many FADH_2 are produced in each of the following stages?

- a) Glycolysis?
- b) The bridge reaction?
- b) Krebs cycle?



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The Totals: NADH and FADH_2 carry high-energy electrons to the electron transport chain.

- a) How many ATP are produced for each NADH entering the electron transport chain?
- b) How many ATP are produced for each FADH_2 entering the electron transport chain?



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In summary, for each molecule of glucose entering respiration, approximately how many ATP can be produced?



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For each molecule of glucose in cellular respiration, how many molecules of carbon dioxide are produced? In which stage(s) are they produced?



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Is all of the energy contained in a molecule of glucose converted to ATP?



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What is fermentation?



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During fermentation, approximately how many ATP can be produced per molecule of glucose?



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Name two types of fermentation.



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Which organisms carry out alcoholic fermentation?



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During alcoholic fermentation, pyruvic acid is converted into what compound?

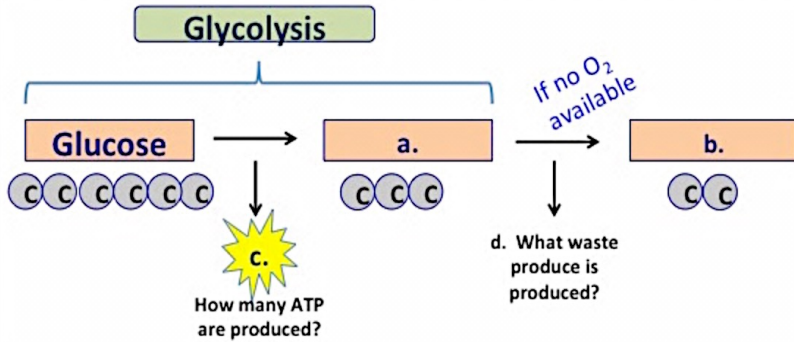


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Summary of alcoholic fermentation. Fill in the missing parts (letters a – d) in the diagram below.



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How are yeasts (and their method of cellular respiration) used in our everyday lives?



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Explain how yeasts (and alcoholic fermentation) can cause bread dough to rise.



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Where does lactic acid fermentation occur?



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Under what conditions might lactic acid fermentation occur?



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What effect does lactic acid have on muscle tissues?



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Lactic acid fermentation is used to produce a wide variety of food items. List foods produced by this process.

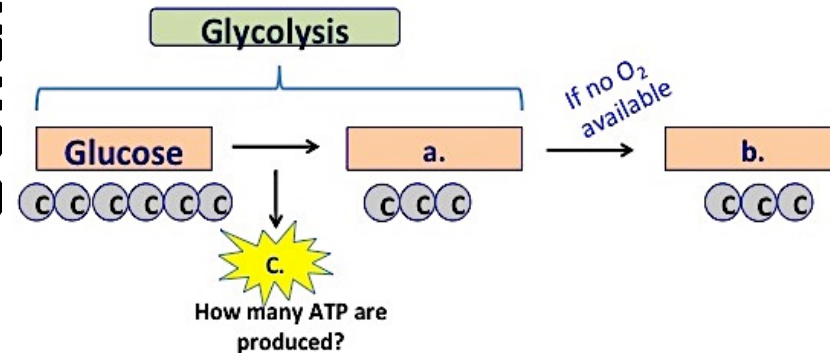


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Summary of lactic acid fermentation. Fill in the missing parts (letters a – c) in the diagram below.





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