

Name: _____ Date: _____ Per: _____

AP Biology Activity - Cellular Respiration Webquest

(go to : <http://zunal.com/webquest.php?user=19049>)

Part I. Overview

1. How is cellular respiration similar to combustion (burning)? How is cellular respiration different from combustion?

2. What is the purpose of cellular respiration?

3. What is ATP? Draw its molecular formula. →

Write the general formula for aerobic respiration.



4. Why is glycolysis considered an ancient process?

5. Fill-in the chart below...

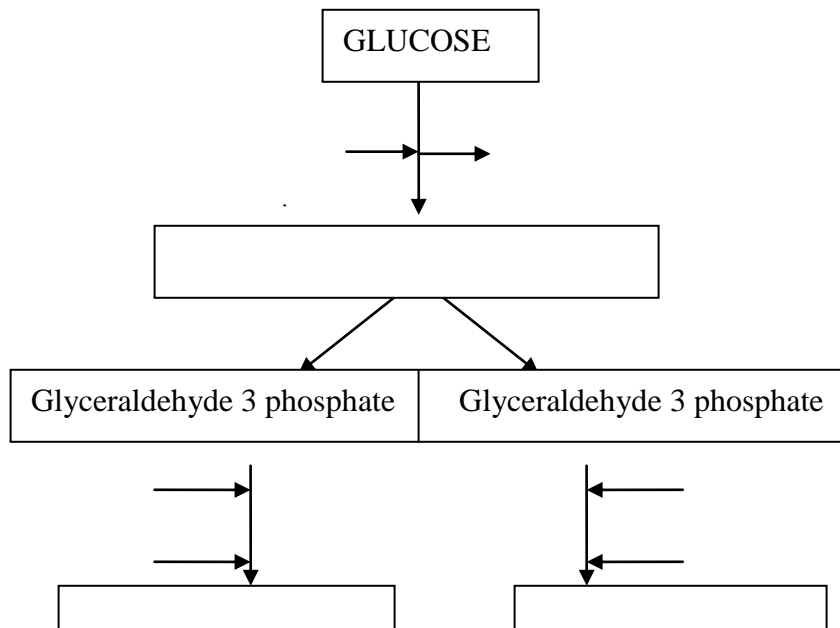
PROCESS	Starting Molecule	Molecules Produced	Net #ATPs Produced	# NADH Produced	# FadH2 Produced
Glycolosis					
Kreb's Cycle					
Electron Transport Chain					

6. Why is oxygen needed in the ETC?

Part II. Glycolysis

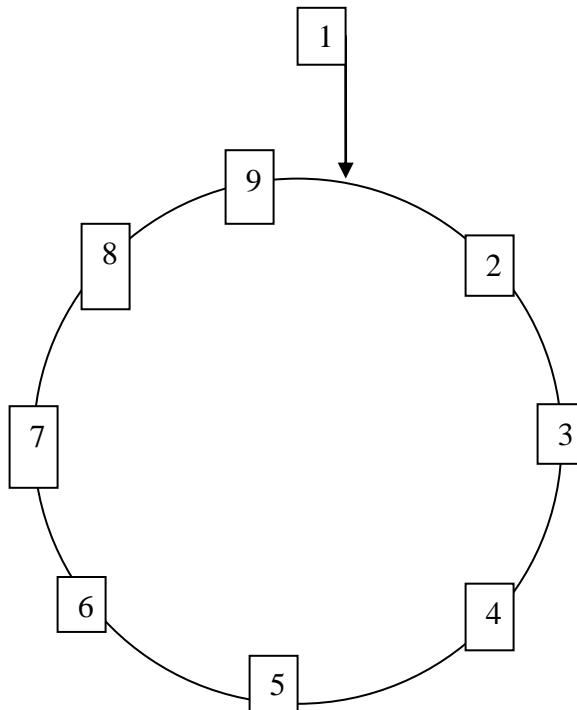
7. How does ATP start this process? How many are needed? _____
8. What atoms in the glucose molecules are replaced by phosphorus? (donated by ATP)
9. What happens to the phosphorylated glucose? The name of the compounds formed is _____
10. Two molecules of NAD⁺ are reduced to _____. At the end of this process, how many Ps are present in the products? _____ What is the name of these molecules? _____
11. Four molecules of ATP are produced by what process? _____
12. Since ____ ATP were used to start glycolysis, what is the net ATP synthesized? _____
13. The final products of glycolysis (_____) can be further broken down by _____ respiration in the _____.

Summarize the steps of glycolysis



Part III Kreb's (citric acid) Cycle

14. The Krebs's cycle takes place in the matrix of the mitochondria. Find a labeled diagram of the mitochondria and print it out.
15. What molecule must be produced from pyruvate in order to enter the Krebs's cycle? _____
16. What gas is given off during the above reaction? _____ What molecule is reduced? _____
17. How many steps are involved in the entire cycle? _____
18. How many CO_2 molecules are produced per pyruvate? _____ per glucose? _____
19. How many NADH_2 molecules are produced per pyruvate? _____
20. How many FADH_2 molecules are produced per glucose? _____
21. How many ATP are produced per glucose molecule in the Krebs's cycle? _____
22. Show where CO_2 , ATP, NADH_2 and FADH are produced in the cycle below by arrows coming off the cycle.



Part IV – The Electron Transport Chain (ETC)

23. Why is the final process of aerobic respiration called the electron transport chain?

24. With oxygen as its final electron acceptor, what is the end product of the ETC?

25. How many ATP are produced by each use of the ETC? _____

Go to the Rodney Boyer animation and answer the following

26. Which two molecules begin the ETC by donating electrons? _____ and _____ .

27. Click on ETC. Where in the mitochondria does the ETC occur? _____

28. Click on ATP synthesis. As the electron from NADH enters the chain, what is pumped into the inter-membrane space? _____ How many? _____. As the electron from FADH₂ enters the chain, how many are pumped? _____

29. What are the relative charges on either side of the membrane? _____

This is called the _____ gradient. Click this link.

30. What passes through the proton channel? _____

31. Is this by diffusion or active transport? _____

32. What is produced by this special protein channel as H⁺ ions continue to pass through it? _____

How is it created? _____

Go to the animation of electron transport by Thomas Terry for the following. Watch animation then go to animation of ATP synthesis link.

33. Note what portion of the mitochondria accumulates a positive charge _____.

34. What is the specific name of the protein channel (machine) that makes ATP? _____

Go to the second link on the webquest page and watch the movie.

35. In which direction is the upper unit of ATP synthase moving, clockwise or counter clockwise?