

ELECTRON TRANSPORT & CHEMIOSMOSIS Step 4

ETC is located where: INNER-MITOCHONDRIAL MEMBRANE

Electrons from hydrogen atoms, carried by NADH and FADH₂, are donated to PROTEIN molecules or complexes within the INNER MEMBRANE of the mitochondria.

CRISTAE

The energy released from **e⁻** passing through these complexes drives the movement of **WHAT** ions across the membrane? H⁺

How do these ions move across the membrane?

From the MATRIX TO THE INTERMEMBRANE SPACE or from the INTERMEMBRANE SPACE TO THE MATRIX: Circle the correct answer

What is the purpose of O₂ with regard to the ETC? FINAL ELECTRON ACCEPTOR, CREATING H₂O

What does 1/2 O₂ produce when it combines with **e⁻** and **H⁺** available in the matrix at the end of the chain? H₂O

In **CHEMIOSMOSIS**, what is happening to H⁺ ions that have collected in the intermembrane space? MOVING THROUGH ATP SYNTHASE

What is the name of the **enzyme** that acts as a turbine, phosphorylating ADP to ATP using free phosphates in the matrix?

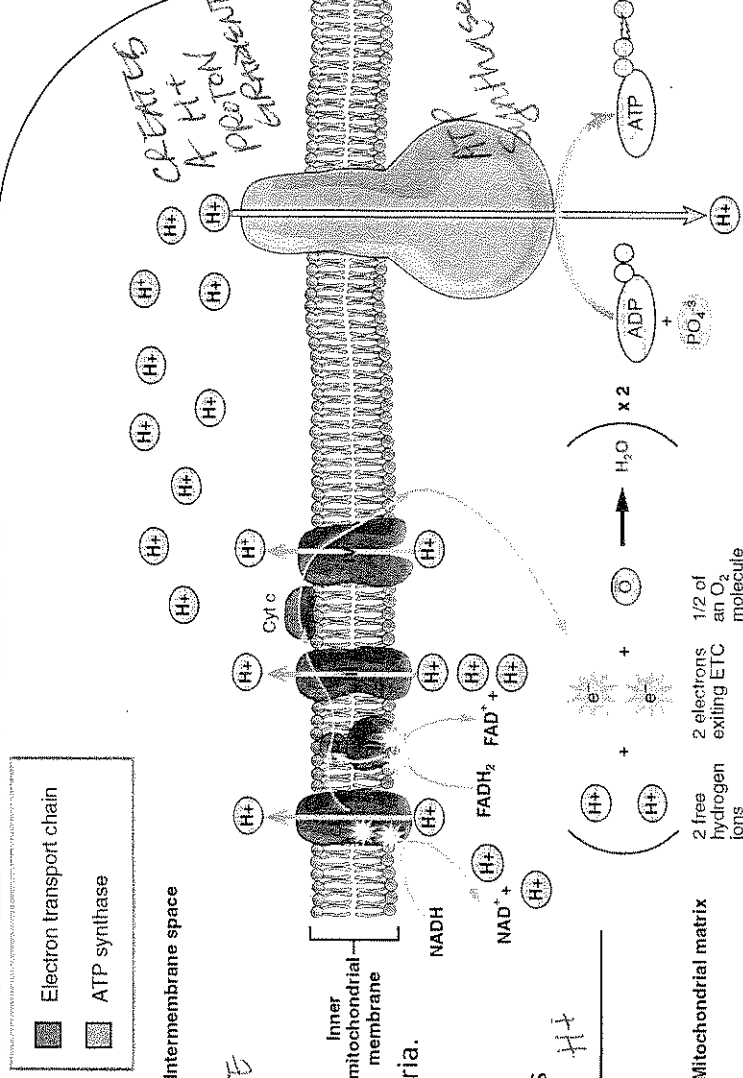
ATP SYNTHASE

The ATP produced in glycolysis and Krebs's cycle is said to have been made through substrate-level phosphorylation. What does this mean? A molecule has phosphates bound to it that are donated to ADP → ATP.



3(10) = 30
 2(4) = 8
 30 + 8 = 38

BUT OFTEN NADH/FADH₂'S

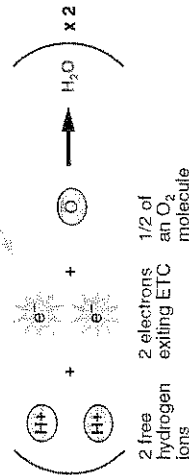


Legend:
 ■ Electron transport chain
 ■ ATP synthase

Labels:
 Inter-membrane space
 Inner mitochondrial membrane
 Mitochondrial matrix

CREATES K⁺ H⁺ PROTON GRADIENT

ATP SYNTHASE



38

AP Biology Cell Respiration Review Please fill in the information required below.

GLYCOLYSIS Step 1

Takes 1 $C_6H_{12}O_6$ molecule & oxidizes it

Takes place where: Cytoplasm / cytosol

Glucose ($C_6H_{12}O_6$) is converted into 2 pyruvate molecules

Why is glycolysis commonly referred to as an "energy investment/energy payoff" stage?
USES 2 ATP TO PRODUCE 4 ATP'S

OXIDATION OF PYRUVATE Step 2

Takes place where: MATRIX

Describe oxidation to acetyl CoA: 3 Steps

- CO_2 IS REMOVED AS WASTED TO OXIDATION OF PYRUVATE
- NAD⁺ IS REDUCED TO NADH + H⁺
- ACETYL (2C) COMBINES WITH CoA (COENZYME A) TO FORM ACETYL CoA

KREBS CYCLE Step 3

Takes place where: MATRIX

A 4-C molecule called OXALOACETATE combines with ACETYL CoA. This becomes a

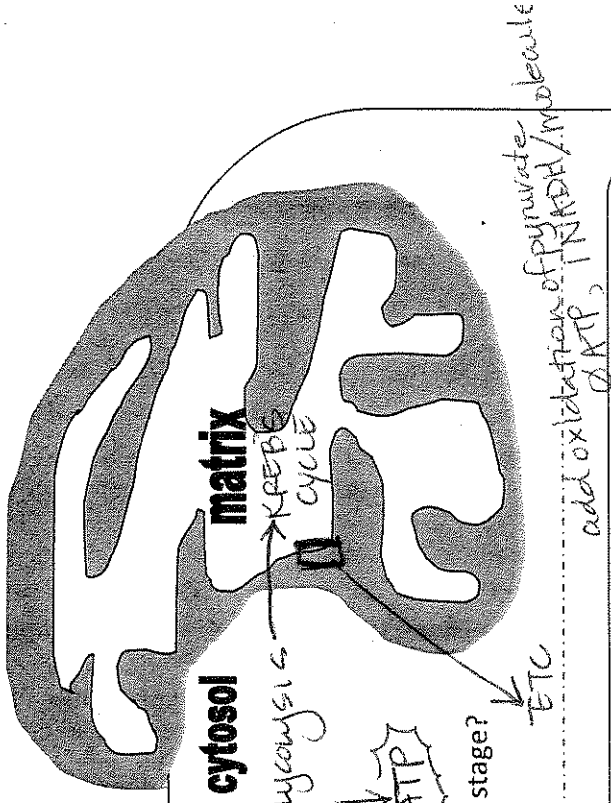
6-C molecule called CITRATE, which is then oxidized HOW MANY TIMES? 2 X

How many ATP molecules are produced per initial pyruvate: 1

How many NADH molecules are produced (including oxidation of pyruvate) per initial pyruvate? 4

How many $FADH_2$ molecules are produced per initial pyruvate? 1

How many CO_2 molecules are released per initial pyruvate? 2 in Krebs's alone



	Glycolysis Step 1	Krebs Cycle Step 2	Step 1 + Step 2
Total ATP (net)	2	2	4
Total NADH	2	8	10