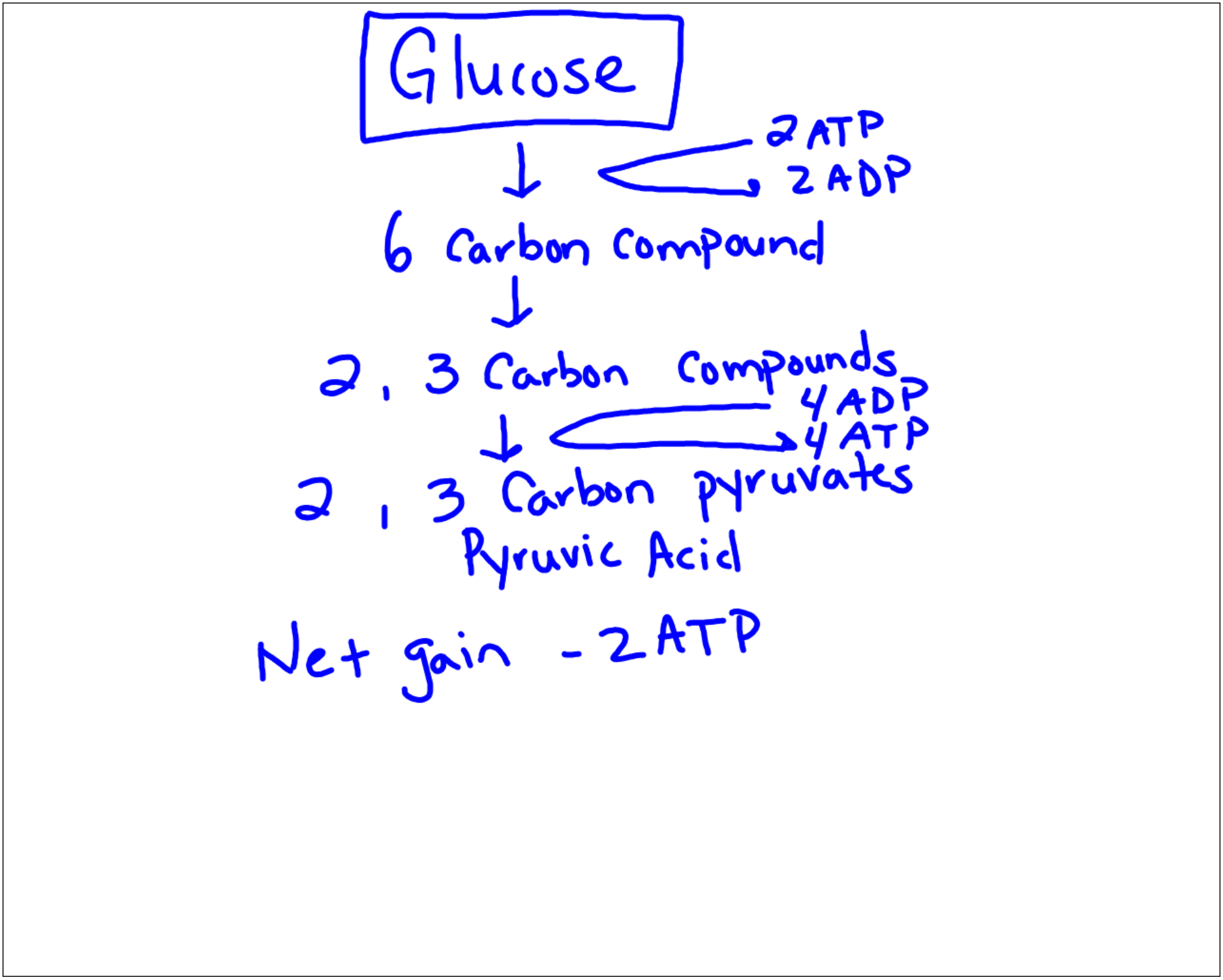
Cellular Respiration

Big Idea - cells use food to release energy.

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + ATP$$

Part 1: Glycolysis
glucose is split into pyruvic acid;
2 ATP made.
Anaerobic process - no O_2 needed
In cytoplasm of the cell.


Glucose
2 ATP
2 ADP
6 Carbon Compound
2, 3 Carbon Compounds
4 ADP
4 ATP
2, 3 Carbon pyruvates
Pyruvic Acid
Net gain -2ATP

2. Kreb's cycle

Continuous cycle - CO_2 given off and 2 ATPs made.

Mitochondria

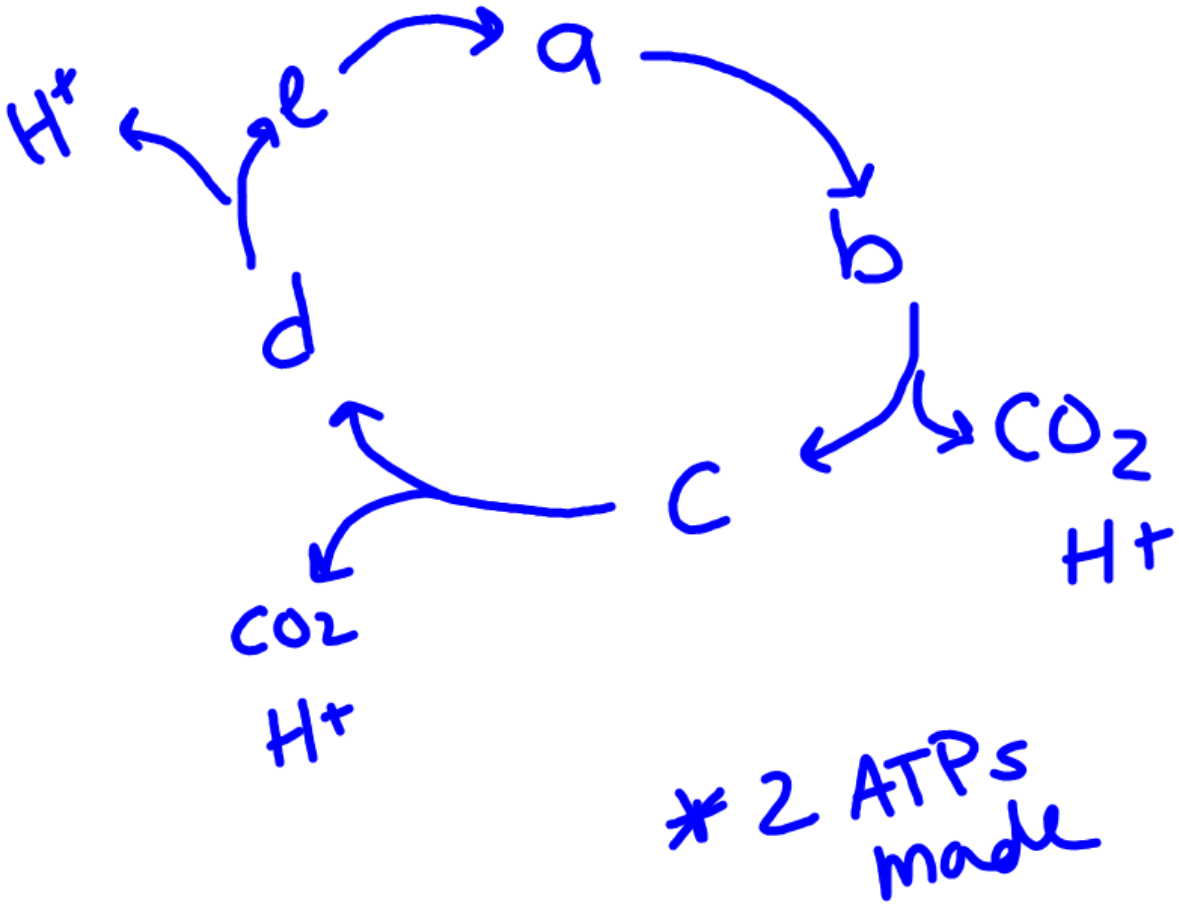
a. 2-carbon molecule combines w/ 4-carbon molecule - Citric acid

b. Citric acid releases a CO_2 molecule and H^+ ion to make 5-Carbon molecule

c. same as b. CO_2 and H^+ - makes a 4-carbon molecule

d. the 4-C releases another H^+

e. 4-C molecules split and cycle starts again.


a
b
c
d
e
H+
CO2
H+
CO2
H+
* 2 ATPs made

3. Electron Transport Chain

Most energy is made - 32 ATP

Membrane of mitochondria

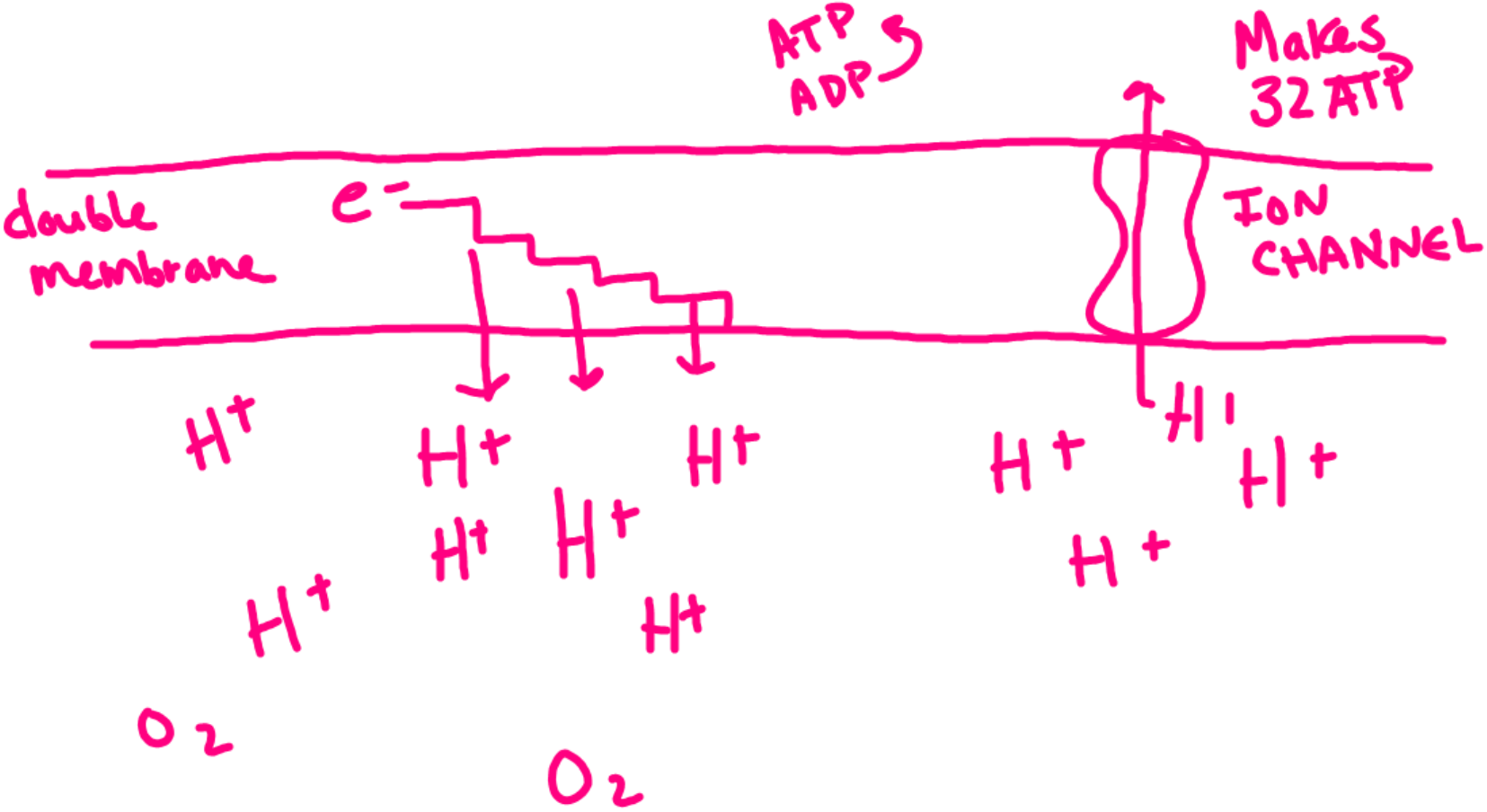
a. High energy e- from Kreb's are put into ETC.

b. pass along molecules embedded in mitochondria membrane.

c. push H^+ (e- lose energy) between membrane layers = concentration gradient.

d. H^+ go down concentration gradient - form ATP

e. H^+ combine O_2 to make water


ATP
ADP
Makes
32 ATP
double
membrane
e-
ION
CHANNEL
H+
H+
H+
H+
H+
H+
H+
H+
H+
H+
H+
O2
O2