

Homework Reminder:

Do Now: Snickers once advertised that their candy provides 'instant energy'. Why was this considered a form of false advertising? How is the sugar in a Snickers bar processed by the body? Bonus: How did Snickers change their advertising?

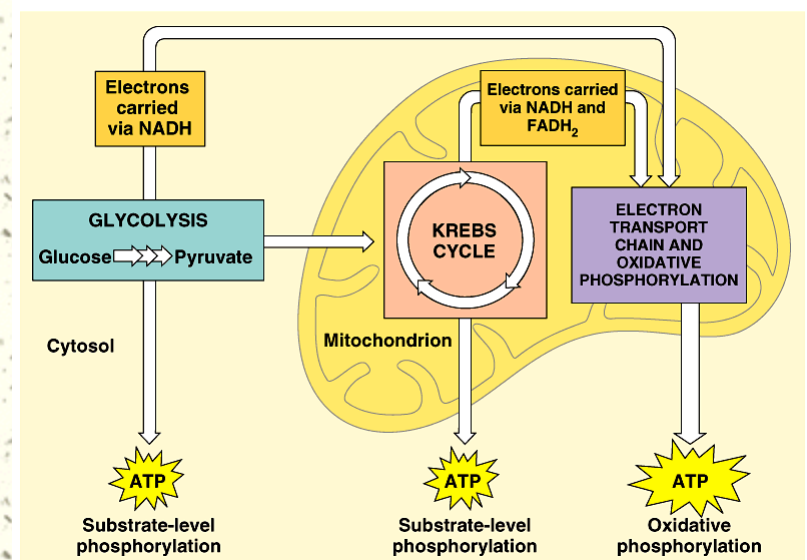
Aim: What is glycolysis?



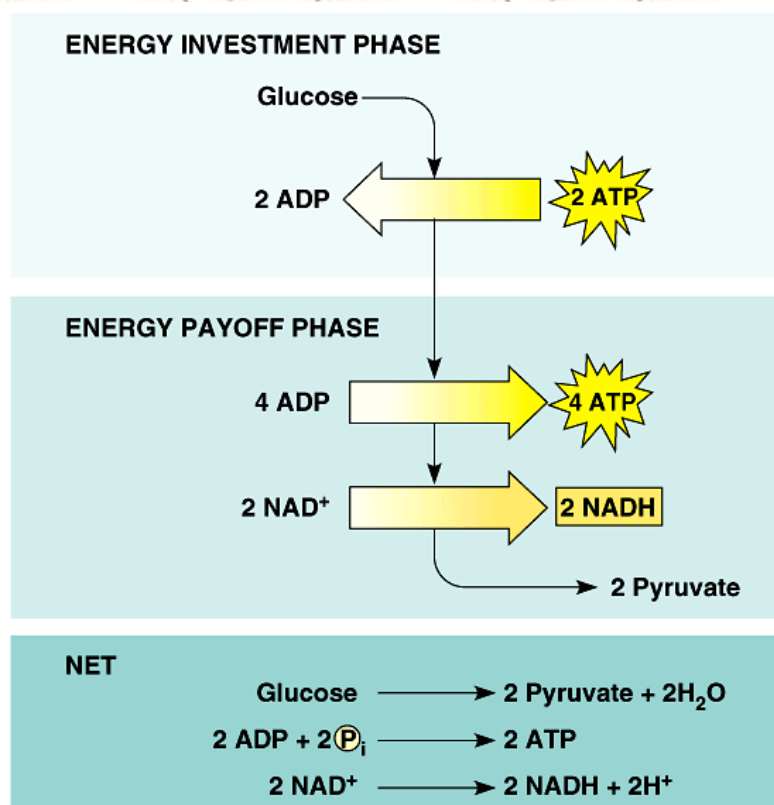
Overview of Aerobic Respiration

Respiration occurs in three metabolic stages:

- 1) Glycolysis (in the cytoplasm of all cells),
- 2) the Krebs cycle (in mitochondria of eukaryotes),
- 3) the electron transport chain and oxidative phosphorylation (in mitochondria of eukaryotes).



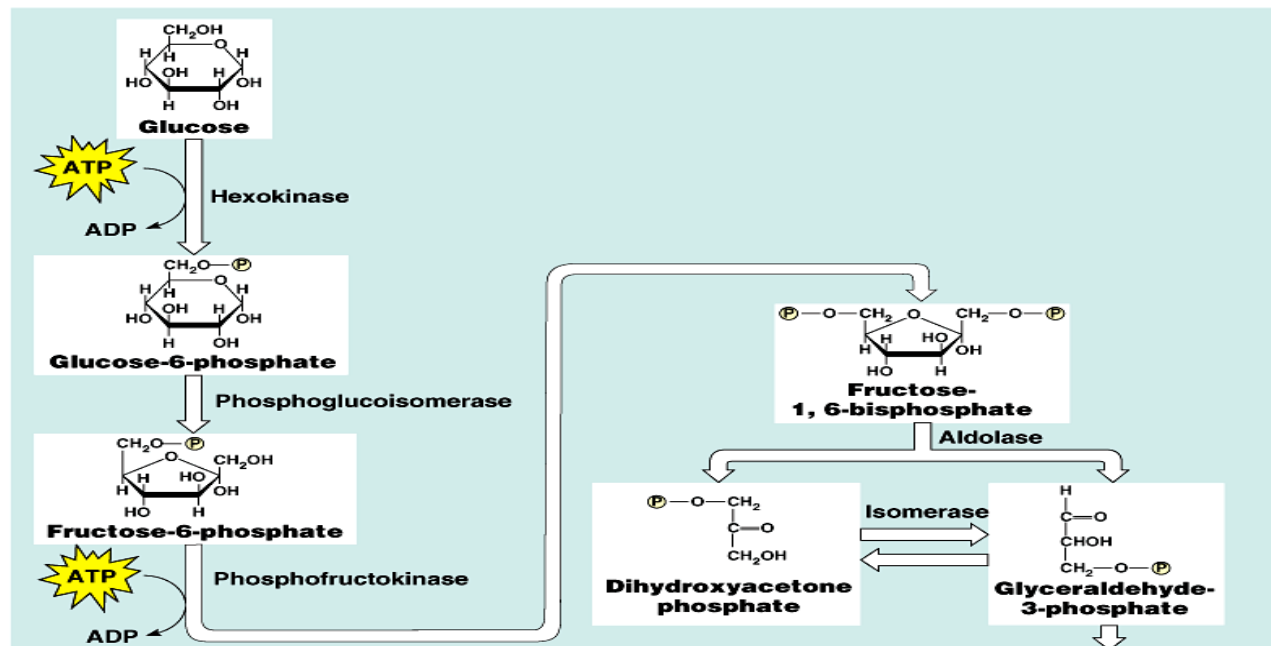
Overall view of glycolysis?



- # During glycolysis,
- # 1) glucose, a six carbon-sugar, is split into two, three-carbon sugars called pyruvate (pyruvic acid).
- # 2) enzymes are required in all ten steps. Each reaction is coupled with the next.
- # 3) Two phases occur (energy investment & energy payoff)

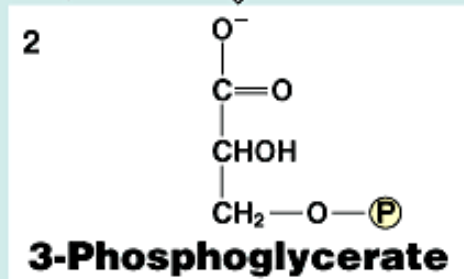
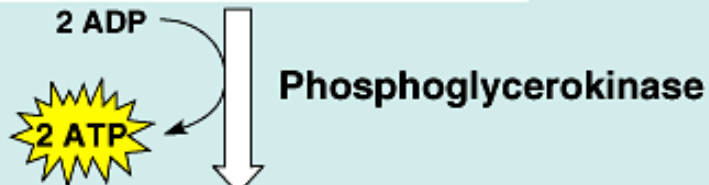
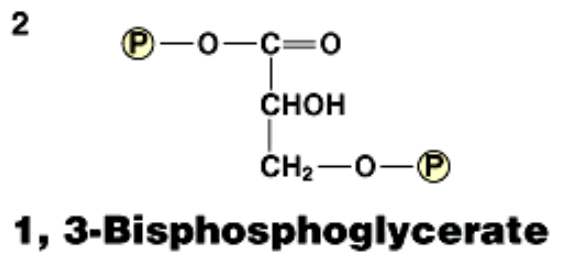
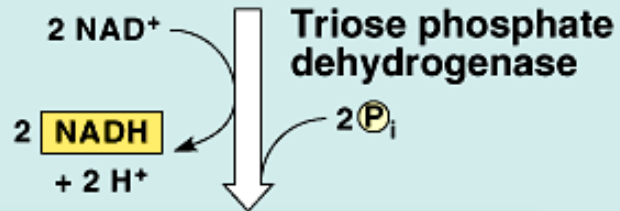
Glycolysis: energy investment

- # In the energy investment phase, ATP provides energy by phosphorylating glucose.
 - This requires 2 ATP per glucose.

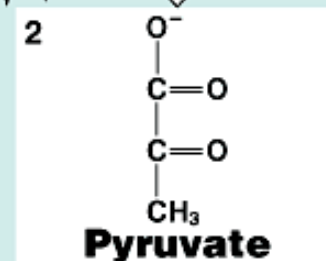
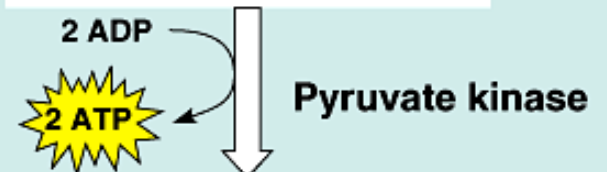
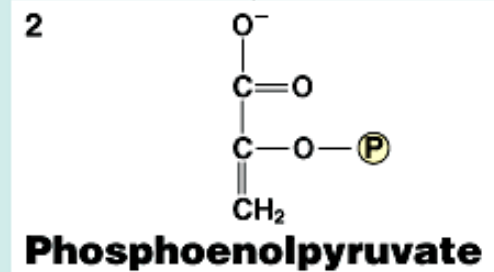
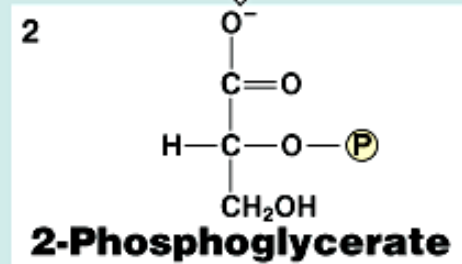


Glycolysis: energy payoff

- # In the energy payoff phase, ATP is produced by substrate-level phosphorylation and NAD^+ is reduced to NADH.
- # 4 ATP and 2 NADH are produced per glucose during the energy payoff phase.
- # Overall, the net yield from glycolysis is 2 ATP and 2 NADH per glucose.
 - No CO_2 is produced during glycolysis.

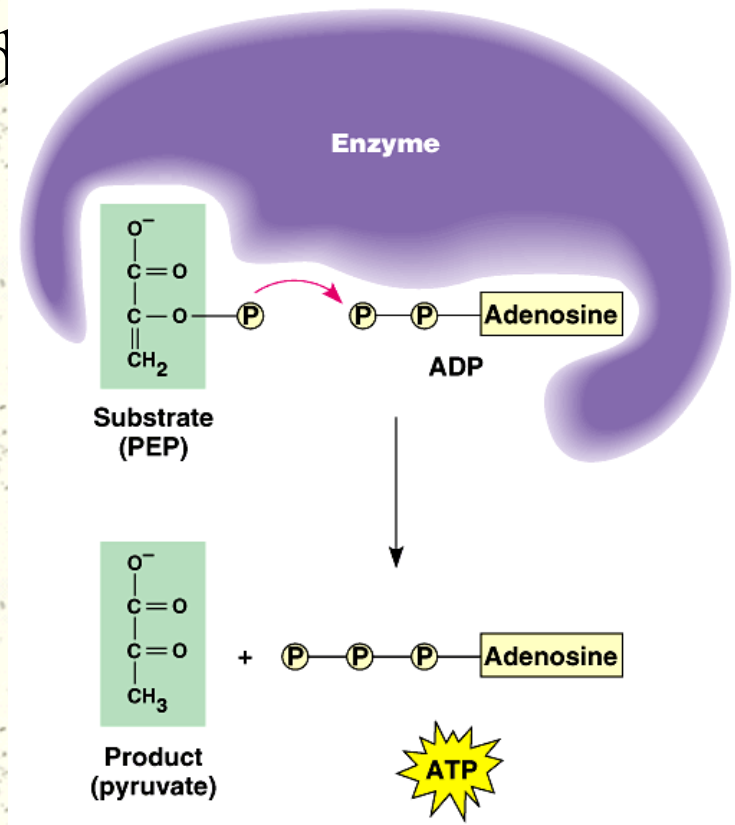


Phosphoglyceromutase



Substrate-level phosphorylation

- Some ATP is also generated in glycolysis and the Krebs cycle by **substrate-level phosphorylation**.
- Here an enzyme transfers a phosphate group from an organic molecule (the substrate) to ADP, forming ATP.



Enzymes involved with glycolysis

- # 1) kinases - phosphorylate the substrate and make it more reactive
- # 2) isomerases - convert the substrate into its isomer (same formula but different shape)
- # 3) dehydrogenases - remove hydrogen from the substrate