| | |
|---|---|
| Aerobic | Requires glucose, oxygen and produces carbon dioxide, water and up to 38 molecules of ATP (2 from glycolysis, 2 from Krebs cycle and up to 34 from oxidative phosphorylation). |
| Anaerobic | Releasing energy from glucose without oxygen (produces lactate in animals and ethanol and carbon dioxide in plants and fungi) and 2 molecules of ATP. |
| Glycolysis | First part of cellular respiration in which glucose is broken down (in the cytoplasm). The overall yield of glycolysis is 2 molecules of ATP, 2 molecules of reduced NAD and 2 molecules of pyruvate. |
| Phosphorylation | Process which makes glucose more reactive by adding 2 phosphate molecules. |
| Oxidation | Loss of electrons or loss of hydrogen or gain of oxygen with a substance. Happens to the two triose phosphate molecules in glycolysis when hydrogen is removed. |
| NAD | A hydrogen carrier molecule which is important throughout respiration. |
| FAD | A hydrogen carrier molecule which is important in the Krebs cycle. |
| Pyruvate | 2 molecules of this are produced by glycolysis. If there is no oxygen present then it will be converted into either lactate or ethanol during anaerobic respiration. If oxygen is present it will be actively transported into the matrix of the mitochondria where it is oxidized to acetate. |
| Link reaction | Process linking Glycolysis to the Krebs Cycle (in the matrix of the mitochondria), where the 2 molecules of pyruvate are converted to $CO_2$ and acetylcoenzyme A. 2 NAD molecules are reduced to form reduced NAD.<br>Pyruvate + NAD + CoA à acetyl CoA + reduced NAD + $CO_2$ |
| Acetyl CoA | Formed in the link reaction when coenzyme A combines with acetate (2C). |
| Kreb's Cycle | A series of aerobic biochemical reactions in the matrix of mitochondria of most eukaryotic cells by which energy is obtained through introducing acetylcoenzyme A into a cycle of oxidation-reduction reactions (in the matrix of the mitochondria). Acetyl CoA combines with a 4C molecule to produce a 6C molecule. This then loses 2 $CO_2$ and hydrogen to give a 4C molecule and ATP due to substrate level phosphorylation. The 4C molecule then combines with acetyl CoA to continue the cycle. Per glucose molecule it produces 2 molecules of ATP and 6 reduced NAD and 2 reduced FAD.<br>2 acetyl CoA + 6NAD$^+$ + 2FAD + 2ADP + 2$H_3PO_4$ à 4$CO_2$ + 6 NADH + 6H$^+$ + 2$FADH_2$ + 2ATP |

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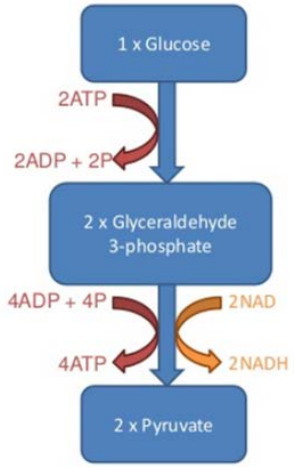
# POPULATIONS KEY WORDS:

**Abiotic** – non-biological factor that makes up part of an ecosystem
**Biotic** – biological factor that makes up part of an ecosystem
**Biodiversity** – the range and variety of living organisms within a particular area
**Biomass** – total mass of living material in a specific area at a given time. (usually dry mass as amount of water varies)
**Climax Community** – the organisms that make up the final stage of ecological succession
**Community** – the organisms of all species that live in the same area.
**Conservation** – method of maintaining ecosystems and the living organisms that occupy them
**Consumer** – any organism that obtains energy by 'eating' another
**Ecological Niche** – all conditions and resources required for an organism to survive, reproduce and maintain a viable population
**Ecosystem** – self-contained functional unit made up of all the interacting biotic and abiotic factors in a specific area
**Habitat** – the place where an organism lives
**Limiting Factor** – a variable that limits the rate of a chemical reaction
**Population** – a group of individuals of the same species that occupy the same habitat at the same time
**Producer** – an organism that synthesises organic molecules from simple inorganic ones. (photosynthetic, 1st trophic level etc.)
**Species** – a group of similar organisms that can breed together to produce fertile offspring

# Glycolysis

- Glycolysis takes place in the cytoplasm of the cell.
- Glucose is first phosphorylated by 2 phosphate groups from 2 molecules of ATP to produce 2 molecules of glyceraldehyde-3-phosphate (GALP).
- GALP is then oxidised and dephosphorylated into pyruvate.
  - In this process, the phosphate groups are transferred to ADP producing 2 molecules of ATP. A hydrogen is transferred to a molecule of NAD producing NADH.
- The net yield of glycolysis per glucose is
  - 2ATP
  - 2NADH
  - 2 pyruvate
- The pyruvate produced then diffuses into the mitochondria.




# Yr13 Knowledge Organiser – Semester 1